MICAL
RARY

MAR 28 1932

No Single Group in Pharmaceutical Activities Can Stand Alone, and Is Helpless in a Degree, without the Support and Coöperation of the Other Associated and Related Groups.

Vol. XXI, No. 3 MARCH, 1932

JOURNAL
OF THE
AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 80th ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN TORONTO, CANADA, IN 1932—August 22nd–27th, Royal York Hotel, Headquarters, R. B. J. Stanbury, 43 Victoria St., Toronto 2, Canada, Local Secretary.

The 1932 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Toronto.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

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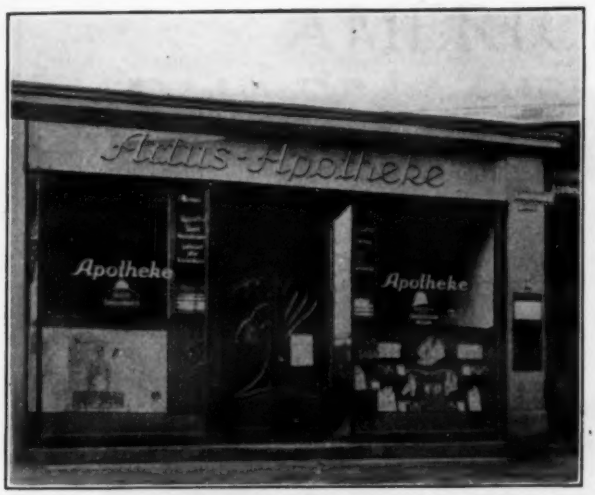
EXTERIOR OF A DANZIG AND OF A BERLIN PHARMACY.

ARTHUR'S COURT PHARMACY.

Danzig is known to pharmacists as the birthplace of Gabriel Daniel Fahrenheit (1686–1736), who devised the thermometer scale known by his name (1714). This Hanseatic City is now, under the Versailles Treaty, the capital of the Free State of Danzig, W. Prussia. The pharmacy here shown adjoins Arthur's Court, built in 1330, and used since 1743 as the Stock Exchange. An illuminated glass panel gives the names of pharmacists on duty at night and on Sunday. Danzig has a population of nearly 400,000.



Arthur's Court Pharmacy.

Drogerie.

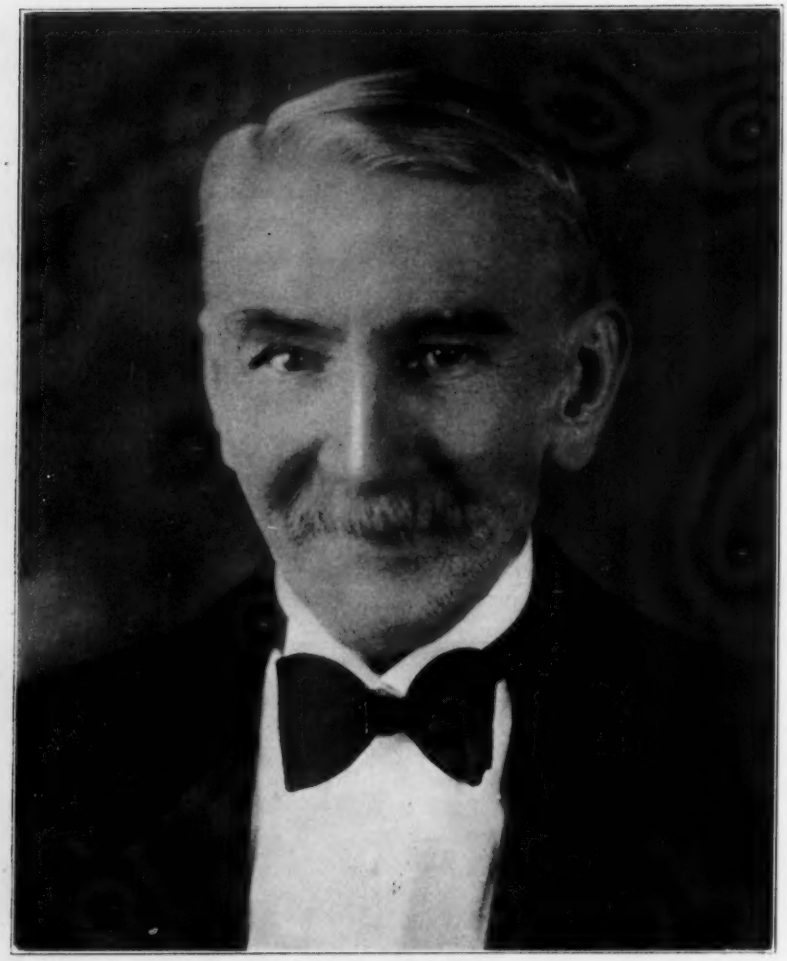
In order to meet the competition of the *drogerie* (unqualified drug stores), the Adler (Eagle Pharmacy) has opened a *drogerie* adjoining its pharmacy.

THE ANGEL PHARMACY.

The Angel Pharmacy at 44 Kanonerstrasse, W.S., Berlin, is owned by Leonhard Leffkowitz. The original privilege, granted by the King in 1739 is one of the oldest in the country. However, in 1928 the antiquated premises were transformed into a modern establishment. It is located opposite Hotel Kaiserhof in the immediate vicinity of Unter den Linden.

The Angel Pharmacy.

"A gallery runs round the pharmacy, part of it being occupied by a homeopathic department; perfumery and toilet accessories are stocked, all under glass. The lighting scheme is new to Berlin, entirely tubular, and by reflection from the ceiling in an unbroken expanse of silver foil, a soft, subdued daylight effect is obtained. The woodwork is figured Caucasian walnut, and is very beautiful."—*Courtesy of William Mair* and *The Pharmaceutical Journal and Pharmacist.*



F. G. UHLICH.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XXI MARCH, 1932 No. 3

FERDINAND G. UHLICH.

Ferdinand Gottlieb Uhlich, of St. Louis, Mo., has been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1881, and his application carries the endorsement of Prof. Charles O. Curtman, for many years a member of this ASSOCIATION.

Mr. Uhlich received his early education in a St. Louis parochial school and, later, attended Fort Wayne College. From 1877–1879 he was a student at the University of Michigan, and graduated in pharmacy at St. Louis College in 1881.

As a youth Mr. Uhlich entered the employ of his father, a pharmacist at 1401 Salisbury Street. He recalls the opening of this store, before the stock had been arranged, because of the first day's prescription, which he still has in his possession. The head clerk had informed the patron that, owing to the condition of the stock, the prescription could not be filled. Ferdinand, imbued with interest because of the new venture, offered his aid in searching for the ingredients and was successful in placing the components of the prescription on the desk for the prescriptionist and, in that way, contributed his first real service to pharmacy.

Mr. Uhlich enjoys the friendship of his fellows, takes a part in association work and, having been engaged in the drug business for more than fifty years, enjoys the rights and privileges of the meetings of the St. Louis veteran druggists. In earlier years he was a regular attendant at the annual conventions of the AMERICAN PHARMACEUTICAL ASSOCIATION. At the age of 73 years, he still takes an active interest in pharmaceutical dispensing and compounding, realizing that pharmacy is the foundation of the drug business.

We are indebted to Secretary W. H. Lamont for these few data, which will have to serve in place of a more extended sketch and we congratulate the golden jubilee member.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase Street, BALTIMORE, MD.

"THE FATHER OF OUR COUNTRY."

THE birthday of no one who has died a century or more ago has ever been memorialized with a celebration comparable with that of George Washington. The birthday of some may have been celebrated with greater pomp, but no one has received finer expression of devotion and, giving due consideration, the citizens of this country may justly question whether one has ever lived who is more deserving of every tribute and honor paid him. It seems strange that so great and good a man as the "Father of Our Country" should have died prematurely, saddened by the unseemly political defamation which made him (perhaps) question whether the Republic—for the life of which he was willing to give everything and had devoted his life—would survive him, because of the aggression and greed of foreign influences and the selfishness and meanness of some of his own people. Now the citizens of his country and the world honor his memory and hold him before each generation as outstandingly worthy of emulation.

It is a fact deserving of thought that the world of that period seemed almost at its worst, overshadowed by a world war and suffering from a financial depression relatively worse than that at the present time. One wonders how one man during a period of his life accomplished so much, and so successfully and efficiently. He brought into his circle a number of outstanding men in various activities and he was able to hold to himself, under most trying times and great suffering, men of most sterling manhood.

In the October number of the JOURNAL, for 1930, there is an article on the Washington Bicentennial in which reference is made to a number of pharmacists and others who had a part in the beginnings of American pharmacy.

This comment is to pay tribute to the one who is first in the hearts of American citizens.

THE PUBLIC HEALTH SERVICE ADVOCATES PROMOTION OF PUBLIC HEALTH BY EDUCATION.

PHYSICIANS in public health work must have the coöperation of the people, and doctors practicing curative medicine must have the coöperation of their individual patients, if either are to be entirely successful, the United States Public Health Service stated February 16th.

"The broad doctrine of modern public health is the promotion of health through the education of the public rather than through the enforcement of sanitary laws," the Service explained.

NOTE: The half-tone of George Washington in the above article is from a photograph of the famous Houdon Bust of George Washington made from life at Mount Vernon, by the great French sculptor, in 1785. This bust has been selected by the Portrait Committee of this Commission as the official picture of the Father of His Country for the Bicentennial Celebration.—The photograph was loaned by the George Washington Bicentennial Commission.

In regard to the relationship between a physician and a patient, the Service pointed out that "it will be observed that the increase in knowledge and skill on the part of the physician has tremendously increased the obligation on the part of the patient to play his part in the treatment of his own disease, or else he should not expect the physician to assume complete responsibility for results."

The Service states further that "physicians engaged in preventive medicine, or public health work have long since learned the lesson that progress can not be made in this field without the intelligent coöperation of the public. The broad doctrine of modern public health is the promotion of health through the education of the public rather than through the enforcement of sanitary laws. This movement enlists, therefore, the intelligent coöperation of the public as the chief weapon which preventive medicine can use, and experience has proved the soundness of this policy. Without an educated and intelligent public to support him, the sanitarian can make very little real progress." Pharmacists have a part in this educational service, because of the information they can give and the direct contact they have with the public. Their knowledge is valuable because it is possible thereby to acquaint the public with the means employed by those engaged in public health service.

Turning to the field of curative medicine the Service states that "the situation is somewhat different, but the principle remains the same. The need of intelligent coöperation by the physician and by the patient who seeks his advice is much emphasized by modern medical methods. Such coöperation was always necessary; but with increased knowledge the skill in the diagnosis and treatment of disease, the demand on the part of both physician and patient for intelligent coöperation has been tremendously emphasized and has placed upon the patient, particularly, demands perhaps not fully realized." Here again the pharmacist has a part in developing the means whereby the physicians can render better service. In a bulletin to the public the pharmacists' service may be made the subject of information, but in these columns references to the surveys now being conducted for revising the United States Pharmacopœia and National Formulary serve the intended purpose. In these surveys of constituents of prescriptions and studies for improving the preparations, standardizing and preserving them, pharmacists are rendering a distinct service to physicians and patients. Coöperation with physicians and exhibits at medical association meetings invariably arouse an appreciative interest.

Another helpful means is being developed by exhibits at state pharmaceutical meetings to which physicians and laymen are invited. The encouragement given by the interest of physicians in U. S. P. and N. F. preparations, joint local and state meetings of doctors and pharmacists to discuss them, and the other coöperative efforts referred to will contribute to the advancement of curative and preventive medicine for the benefit of the public and the professions engaged in the service.

ANTOINE LOUIS BRONGNIART (1742–1804) was the son of a pharmacist and himself pharmacist to Louis XVI. He served as military pharmacist and was placed on the Council of Health of the Army. He was for a time Editor of the *Journal des Sciences, Arts and Metiers.*

A KNOWLEDGE OF PRESCRIPTIONS.

JUST as a study of medicine embodies a knowledge of the functions of the body, so that its disorders may be corrected by the means which experience and science have made known, so a knowledge of prescriptions includes an understanding of the remedial agents which enter into their composition and their preparations; to this end the studies which are part of the pharmacy curriculum are systematized to acquaint students who seek to become pharmacists with the requisite knowledge and to instil the duties and responsibilities assumed by them.

One of the means which leads to a proper understanding of prescription practice is a knowledge of what agents are employed in the treatment of disease, and in preparing the components of prescriptions and properly completing the products. To this end the prescription surveys being carried on have a useful application for physicians and pharmacists. These studies represent more than tabulating the ingredients and determining the number of prescriptions, however essential—there is a why and wherefore in every tabulation. It leads to information regarding the drug, its preparation, its effect, preservation, prescribing and compatibilities in their various relations, and informs the physicians, pharmacists and manufacturers, producers and distributors about the *Materia Medica*. The information derived extends further, even to the proper purchase, storing and packaging, and, with all of these, inculcation of the responsibilities which obtain in these activities for the protection of those engaged and the people.

The surveys will contribute to the progress of the professions concerned and promote better service. All knowledge has value, and the discussion of the surveys next April, in which the U. S. Department of Commerce has been at work, seeking a better understanding by coöperating with those engaged in the important service, will acquaint the Government and the members of the profession with the importance and greater possibilities of these activities.

The progress of the surveys has brought about a realization that these industries are greater by far than heretofore known to the Government and even to those engaged in them. Active participation by pharmacists in these surveys will develop pharmacy and its industries, strengthen professional relations and, may we say, stimulate a better understanding and higher appreciation of pharmacy as a public health service.

OPINIONS ON PRESCRIPTIONS OF ALCOHOL.

UNDER above title the *Journal of the American Medical Association* of February 13th comments as follows:

"Hearing before the Senate committee that is concerned with the bill introduced by Senator Bingham to modify the prohibition regulations have brought to light some astounding testimony. Among those who have participated in giving evidence was a former president of the American Medical Association—Dr. Arthur Dean Bevan. It is unfortunate that physicians should testify beyond their scientific opinions regarding the effects of alcoholic liquors on the human body. Dr. Bevan seems to have ventured positive statements on the social effects of alcohol and on the ethical aspects of medical prescribing. In proffering his opinions, Dr. Bevan demonstrated an extraordinary lack of confidence in his professional

brethren. He moralized on the terrific temptation confronting the profession through the fact that many physicians have incomes of approximately $2500 a year and, in the right to prescribe, have seen, in his opinion, an opportunity to make $1200 extra. Dr. Bevan is apparently familiar with the cost of whisky per case at corner drug stores; he asserted that a considerable number of physicians were providing the signed prescriptions that permitted druggists and bootleggers to sell this liquor by the case. The *Journal* wishes to protest editorially against this expression of opinion by one of the past-presidents of the Association. If Dr. Bevan has actual evidence that any physician is selling his prescriptions *en masse* in order to permit druggists and bootleggers to dispose of whisky in case lots, he, and all of those who possess the information, are equally guilty with those who are violating the law in permitting the violation. If he has not the evidence, he is certainly without warrant in making such a statement to a Senate committee; in any event he is not justified in indicting the entire profession for the misdemeanors of a few. His statement reflects great discredit on a profession whose ideals are certainly as high as those of any other professional group in the country. As a leader of that profession for one year, he should be more familiar than he seems to be with its ethical standards and with the extent to which physicians actually are guided by a proper appreciation of moral values."

The prescribing of medicines, alcoholic or otherwise, comes within the province of the medical profession; pharmacists compound prescriptions and the law requires that those for spirituous liquors can only be dispensed on written prescriptions of physicians; a like requirement obtains with prescriptions containing narcotics.

In accepting the duties assigned to pharmacists, under the laws referred to, they assumed serious obligations, and it is a source of pride that they have met their responsibilities with the approval and satisfaction of those who look after the enforcement of these laws. No one acclaims perfection, but it is not just that those who perform duties, not altogether of their choosing, be charged by inference with being activated by mercenary or other unworthy motives and submit to attempts at having their profession discredited.

PROF. LEON GUIGNARD died, March 7, 1928, at his home in Paris, France, aged 75 years.

In 1876, he gained an interneship as pharmacist in the hospital of Paris, later taking charge of the laboratory. In 1883, he was elected Professor of Botany at the University of Lyons and four years later to a like chair in the Pharmacy School of Paris. Many honors came to him on account of his achievements and among the distinctions and degrees were silver and gold medals of the interneship, the superior diploma of pharmacy, the doctorate of natural science, the Bordin Prize of the Institute and the Buignet prize of the Academy of Medicine, and he was honored with the presidency of the Botanical Society of France, the vice-presidency of the Society of Biology, as honorary president of the Society of History of Pharmacy, and of the Association of Students in Pharmacy of France. He was a former president of the French Academy of Science, a member of the Academy of Medicine, and the National Academy of Agriculture in France, officer of the Legion

of Honor, member of the Superior Board of Public Instruction, of the Board of the University of Paris, and of a great many other commissions and committees, both foreign and of France.

Prof. Guignard largely contributed to research by his investigations of diastases, glucosides and principles which furnish cyanhydric acid in various plants, and the constituents of the cruciferous and other families. To him is also ascribed much knowledge relative to mucilage secretions that exist in the *Laminaires* and of the oleoresins of the *Copaifera* and of other leguminous plants, and also valuable studies on the origin and structure of seeds of a large number of plant families.

DR. JOHN G. GADAMER (April 1, 1867, died April 5, 1928) was one of the foremost German pharmacists engaged in research work. Dr. Gadamer succeeded the late Prof. Ernst Schmidt at the University of Marburg, where he carried on most of the work that contributed to his great name in research. After the death of his predecessor he revised and reëdited the several books of which Professor Schmidt was author.

After graduating from the "gymnasium" at Waldenburg, Germany, he accepted an apprenticeship under Apotheker Dankwortt in Magdeburg; following service, elsewhere, in other pharmacies. In 1891, attracted by the work and reputation of Prof. Dr. E. Schmidt, he matriculated at the University of Marburg. Up to this time, Gadamer had shown great interest in botany, but under the tutelage of Prof. Schmidt he soon took a deeper interest in chemistry.

In 1893, he passed the State Board examinations and in the same year became Private Assistant to Prof. Schmidt. The following year he was elected University Assistant in the Chemical-Pharmaceutical Institute at Marburg. In 1895 he presented a thesis on "Thiosinamin and Its Halogen Addition Products" and obtained the Ph.D. degree. He now decided to devote his life to academic work and, in 1897, because of his work on the constituents of black and white mustard he was appointed Assistant Professor of Pharmaceutical Chemistry and of Food Chemistry. At this time he determined the constitution of sinigrin, sinalbin and sinapin. After considerable more work on similar glucosides, he took up the study of the alkaloids and explained the conversion of hyoscyamine into atropine and of *d*-scopolamine into *i*-scopolamine. In 1902, he was appointed professor at the University of Breslau, where he not only organized the Pharmaceutical Institute but also found sufficient time to continue his research work. Dr. Gadamer developed a theory on the formation of alkaloids in the plant and of their biological value to the plant.

Pharmacists Have Responsibilities of Service and Also Duties Which Include Making the Public Acquainted with Pharmacy, Its Mission and Its Part in the Life of the State and Nation.

SCIENTIFIC SECTION

PHYSICS IN PHARMACY.

PART IV.*

BY JOHN URI LLOYD, WOLFGANG OSTWALD AND WALTER HALLER.

ON THE VARIOUS PHYSICAL CONDITIONS NECESSARY FOR THE FORMATION OF PENDANT AND WETTING DROPS.

1. When two different non-miscible liquids are poured together, they usually separate into two layers, the heavier liquid below, the lighter liquid above the other. The force of gravity seeks to produce a horizontal interface between them.

Many years ago, the senior author found and examined a great number of cases in which the liquids behave altogether differently. For example, in glass tubes the surface of contact (meniscus) does not always form a horizontal plane, but is curved more or less, upward or downward, according to the nature of the liquids, the width of the tube, temperature and the physical condition of the glass surface. With many pairs of liquids, one observes very unique drop formations at the common surface, *e. g.*, drops of heavier liquid which float upon the surface of the lighter liquid (pendant drop), or drops of the lighter liquid creeping along the glass wall until it even may rest below the heavier liquid (wetting drop). These "absurd" formations seem at first to be creations of accident; however, the senior author showed that they were entirely reproducible, and that they formed with complete regularity upon using definite pairs of liquids. Thus, for example, a pendant drop is always formed when chloroform is added to water in a glass cylinder, even after vigorously shaking the two liquids together and then allowing them to settle.

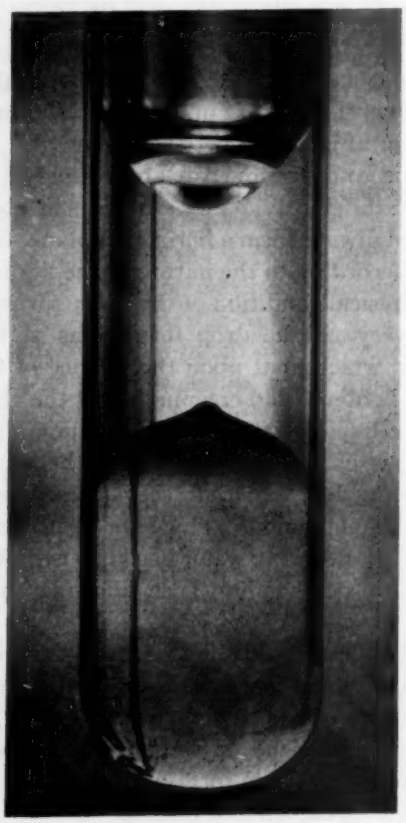
All these phenomena, the curvature of the menisci as well as the odd drop formations, are typical interface phenomena, and are therefore in closest relation with interface tensions. In a preceding article we were able to show, theoretically, in what manner the form and size of pendant drops depend on the interface tension between the liquids. Then the experimentally measured form and size of drops corresponded accurately to the measured value of the surface tension.

2. Of an importance equal to that of the interface tension is the *wetting* of the glass wall by the liquids. In many cases, wetting must be considered the real cause determining the shape of the interface surfaces. For example, the curvature of the meniscus is due to the difference in the wetting abilities of the liquids. The better-wetting liquid seeks to displace the other liquid from the glass wall, and in spreading along the wall, draws along with it the interface (liquid-liquid) like an elastic film. The edge of the interface is drawn upward or downward, *i. e.*, the meniscus is curved convex above or below, according to whether the better-wetting liquid lies above or below the other.

Somewhat more difficult it is to explain the mode of formation of the remarkable drop phenomena, such as pendant drops and wetting drops. Here also, wetting plays a principal part, which is especially evident with the wetting drop. For

* Translated from the German by Dr. Sigmund Waldbott. Presented before Scientific Section, A. PH. A., Miami meeting, 1931.

example, such a wetting drop is formed when a drop of water is put upon chloroform contained in a glass tube. The water readily wets the glass wall, doing so more pronouncedly than does the chloroform; for this reason it creeps downward along the glass wall, displacing the chloroform. When more water is added, the wetting water-ring becomes broader, until finally, after reaching a definite limit of stability, it melts together, forming a massive layer.[1] Evidently, the driving force of the



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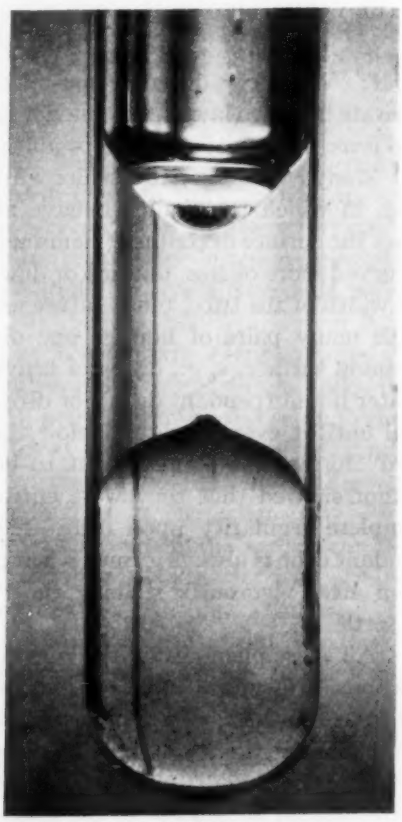

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Fig. 1.—Nitrobenzol under water; pendant drop of nitrobenzol upon the water surface. The nitrobenzol is only partially in wetting contact with the glass walls (note the black lines between nitrobenzol and glass). Fig. 2.—One hour later. The nitrobenzol begins to wet a greater area.

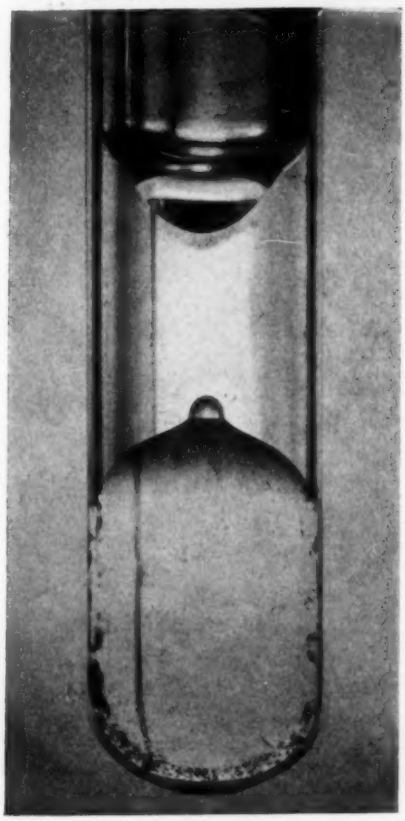
wetting drop consists in the strong wetting power of the liquid.

Considered more closely, the existence of the wetting drop depends not only on the wetting property, but also on the properties of the remaining interfaces involved. In the preceding article of the joint authors, the conditions which the interface tensions must satisfy in order that a wetting drop may form, were deduced by theoretical reasoning based on capillarity. These considerations, which need not be repeated here in detail, resulted in establishing the following conditions:

[1] A detailed description of the phenomenon, with drawings and photos, was given in the preceding article of the authors, JOUR. A. PH. A., 20 (1931), 95.

(1) $S_{A\text{-glass}} < S_{B\text{-glass}}$.
(2) $S_B > S_A - S_{AB}$
(3) $S_B < S_A + S_{AB}$

$S_{A\text{-glass}}$ is the wetting tension of liquid A.
$S_{B\text{-glass}}$ is the wetting tension of liquid B (wetting drop).
S_A is the surface tension of liquid A.
S_B is the surface tension of liquid B.
S_{AB} is the interface tension between both liquids.



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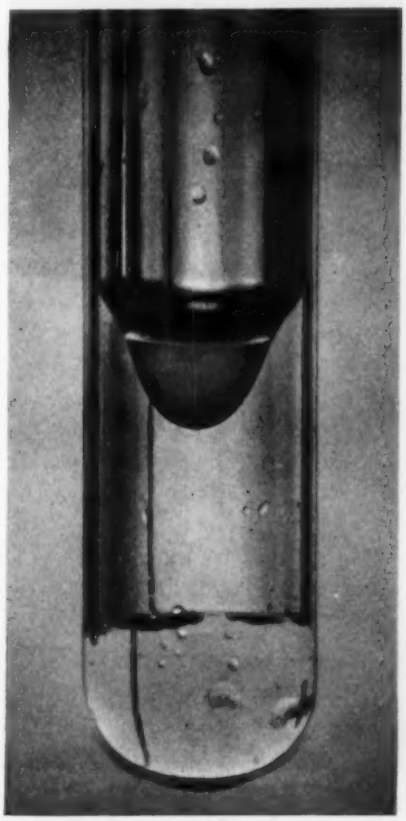

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Fig. 3.—One day later. Now the nitrobenzol is nearly totally wetting the glass wall. Small droplets of water (visible as dark spots at the edges) remain. Fig. 4.—The same nitrobenzol taken out with a fine pipette. Small droplets of wetting nitrobenzol remain attached to the glass wall above the nitrobenzol layer.

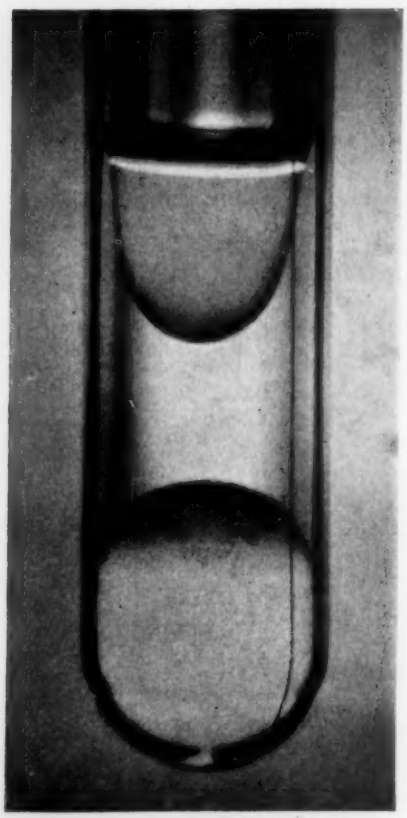
Exactly the same conditions prevailed in the formation of the pendant drop.

These equations therefore explain the regular appearance of the strange drop phenomena exhibited by specific liquids, as the senior author has shown, through the fulfilment of very definite physical conditions. Thus it is only necessary to know the different interface tensions to be able to predict whether a pendant drop or wetting drop can form or not. Conversely, whenever a pendant drop or wetting drop has formed, it follows that the interface tensions satisfy the above conditions.

The important part which wetting plays in the remarkable drop phenomena, induced us to investigate the wetting phenomena more in detail, experimentally.

3. MEASUREMENT OF WETTING TENSIONS.

Quite a series of methods exist for the measurement of the wetting tension. It may be determined, for example, from the pressure with which a wetting liquid



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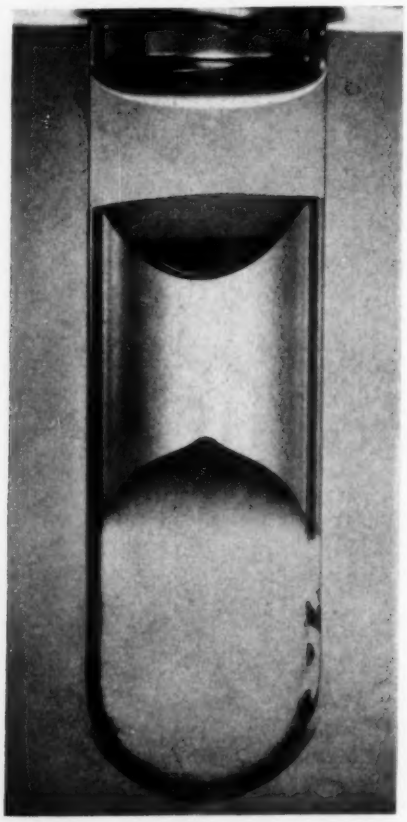

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Fig. 5.—Chlorobenzol under water. Pendant drop of chlorobenzol above. The chlorobenzol wets only in a very small area at the bottom. Fig. 6.—One day later. The chlorobenzol has made a little progress in wetting. The broad black line which is characteristic for water wetting has partially been replaced by the very fine line of chlorobenzol wetting. Chlorobenzol poured upon the surface wets at once (very thin lines) because the glass walls are quite dry.

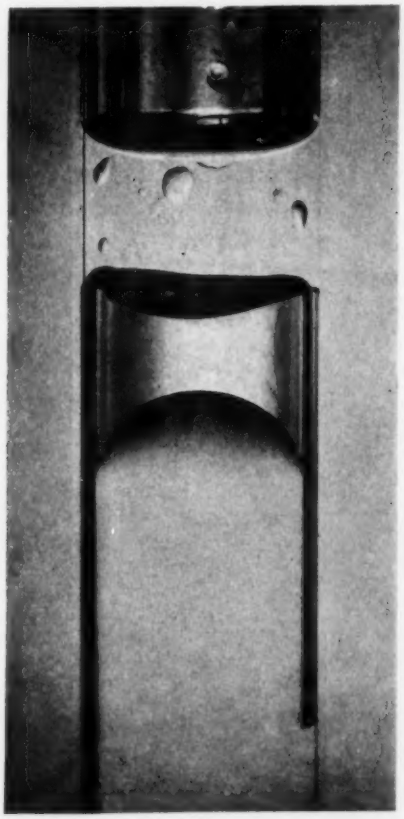
penetrates into capillary spaces; or from the edge angle under which the liquid surface clings to the solid surface, or by different other methods.[1]

However numerous these methods are, their results are frequently unsatisfactory. In carrying out the measurements, difficulties often arise, owing to the fact that wetting is a very complicated process. The wetting tension is exceedingly sensitive toward the slightest irregularity of the solid surface. Even very small traces of impurities alter the wetting tension, which is probably also affected by

[1] A review of the different methods is given by W. Haller in *Kolloid-Z.*, 53 (1930), 247.

thin layers of adsorbed air. Besides, the wetting tension at different points of a solid surface is practically never of equal magnitude.

In order to avoid these difficulties in the measurement of the wetting tension, we have applied a new method which is independent of small irregularities in the surfaces. We connected the liquid with a horizontal capillary tube, and determined the velocity and the negative pressure with which the liquid was sucked into the



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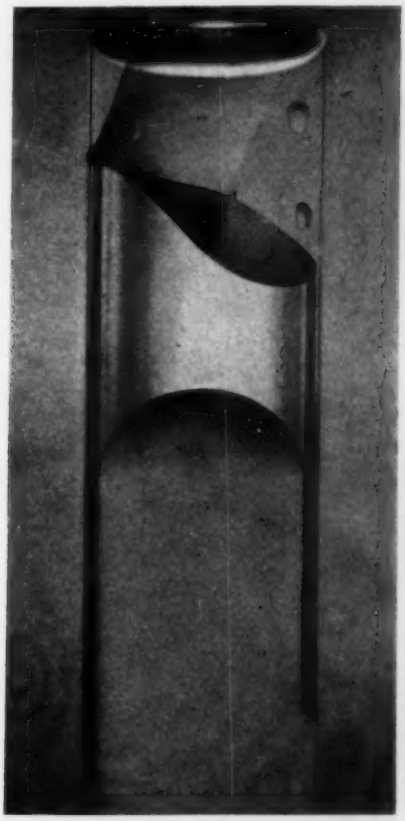

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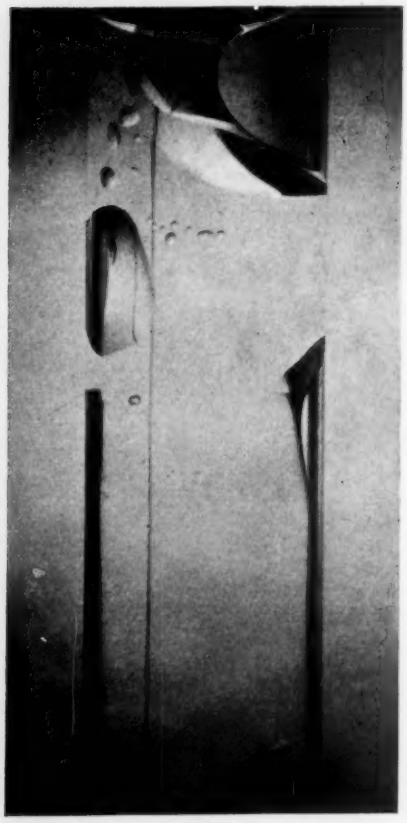
Fig. 7.—The same. Some quantity of chlorobenzol has been added to the chlorobenzol layer below with a fine pipette, so that all menisci were forced to rise. In rising, the meniscus between the upper layer of chlorobenzol and the water has become irregular by the action of the strong hysteresis of wetting which binds the chlorobenzol to the glass. Partially the meniscus has even become concave to the water. Fig. 8.—The same, water added to the middle layer.

capillary tube on account of the wetting tension. During such a measurement the meniscus of the liquid was in motion, and the fact developed that it smoothly passed over the invisible, unavoidable irregularities of the surface, while the stationary meniscus would have been arrested at these spots. From measurements at different velocities, the wetting pressure of the resting meniscus was calculated by extrapolation, and from it the wetting tension of the liquid. The measurements by this method gave very exact and reproducible results. A few results are given in the following table.

WETTING TENSIONS TOWARD GLASS.

i-Amylalcohol	22.7 dyne/cm.	Aniline	39.7 dyne/cm.
N-Heptylacetate	23.9 dyne/cm.	Acetophenone	40.6 dyne/cm.
Petroleum	24.8 dyne/cm.	Glycol	43.9 dyne/cm.
N-Hexanol	25.6 dyne/cm.	Water	50.5 dyne/cm.
Benzylalcohol	37.0 dyne/cm.	Glycerin	62.6 dyne/cm.
Lactic acid	38.5 dyne/cm.		

A more detailed description of this method and additional results have been communicated elsewhere by one of us.[1]



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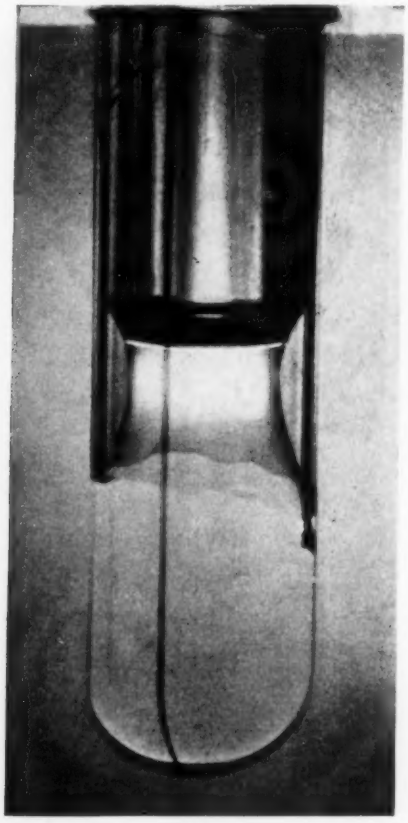

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Fig. 9.—The same. Chlorobenzol added. Fig. 10.—Wetting drop of water on acetophenone. Some water was poured upon a layer of acetophenone. It creeps down along the glass walls forming a ring of wetting water.

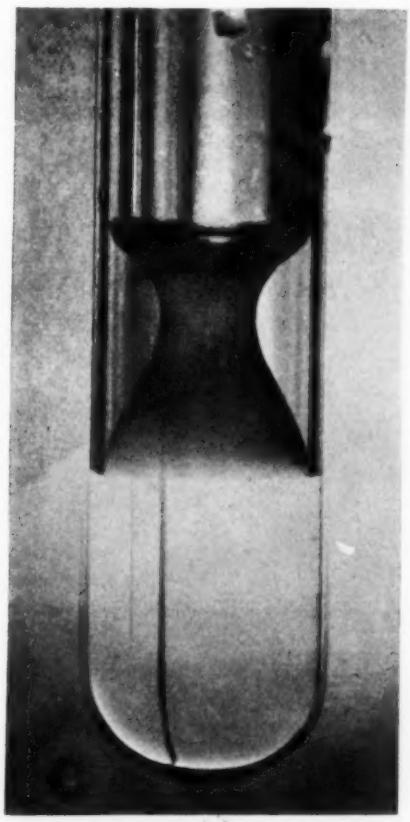
4. WETTING DISPLACEMENT.

Two liquids, when in simultaneous contact with a solid body, compete for the wetting surface, and the liquid with the greater wetting tension seeks to displace the other. If, for example, a powdered solid is shaken with two non-miscible liquids, it will be wetted mainly by that liquid which has the greater wetting tension. As the mixture settles, the powder collects in the liquid layer having the greater

[1] W. Haller, *Kolloid-Z.*, 54 (1931), 7.

wetting tension. If the powder is first stirred with the liquid of inferior wetting tension, and is then brought into contact with the better wetting liquid, in this case also it will be ultimately wetted by the better wetting liquid, which displaces the other from the surface of the powder. This phenomenon of *wetting displacement* is of very great importance in practice, chiefly in flotation.

In performing such experiments, it is noted that the displacement of a liquid from the solid surface becomes the more difficult the longer it has been in contact



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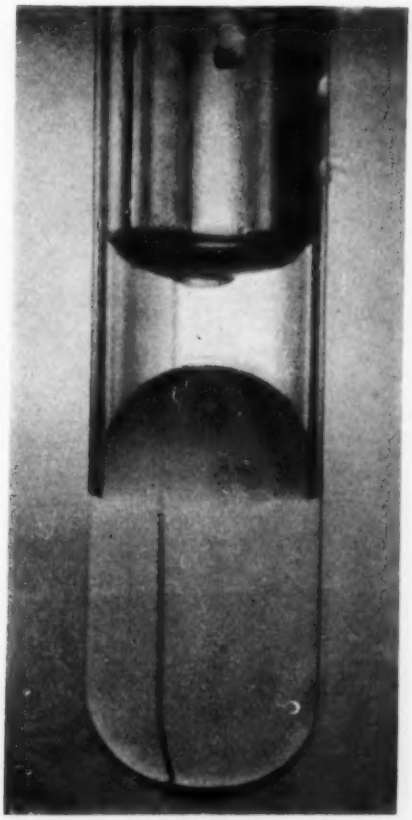

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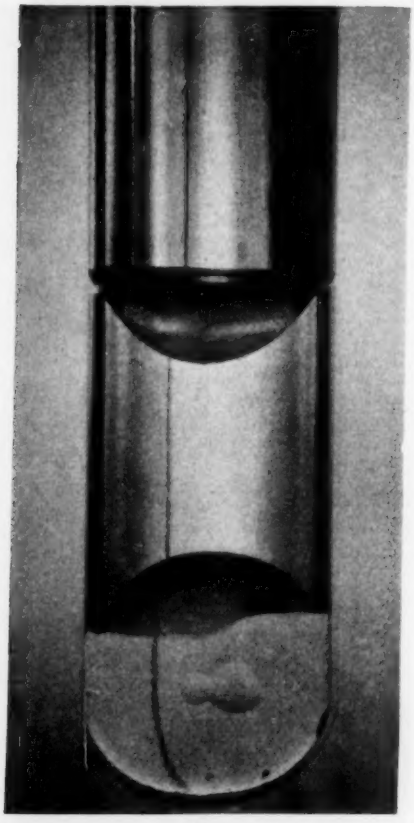
Fig. 11.—The same, more water added. The wetting drop is greater. Fig. 12.—The same. By addition of more water finally the wetting drop unites in the midst of the tube to form a massive layer of water, above which invariably rides a pendant drop. This small pendant drop is analogous to the small remaining drop observed when a drop falls from a capillary.

with it. Thus, for example, F. B. Hofmann[1] found that petroleum which was wetting powdered glass, could be easily displaced by water a few seconds thereafter, but was displaceable by water only with great difficulty after some hours. This changeability dependent on time, renders wetting a rather complicated process, at any rate more complicated than the formation of interfaces between two liquids. With liquid-liquid interfaces a definite surface tension exists after a very short time, and on its magnitude alone depend the area and shape of the interfaces.

[1] F. B. Hofmann, *Z. physik. Chem.*, 83 (1913), 389.

This, however, is not the case with wetting; here it seems very necessary to consider not only wetting tension, but also the other peculiarities of wetting.

In the study of the wetting phenomenon it is true that powders are not a favorable material to use, because the solid surface cannot be directly seen. We therefore adopted the method of rendering the wetting displacement visible on larger surfaces, in glass tubes. This was done successfully with the aid of an especial illumination arrangement which enabled us to observe very plainly the



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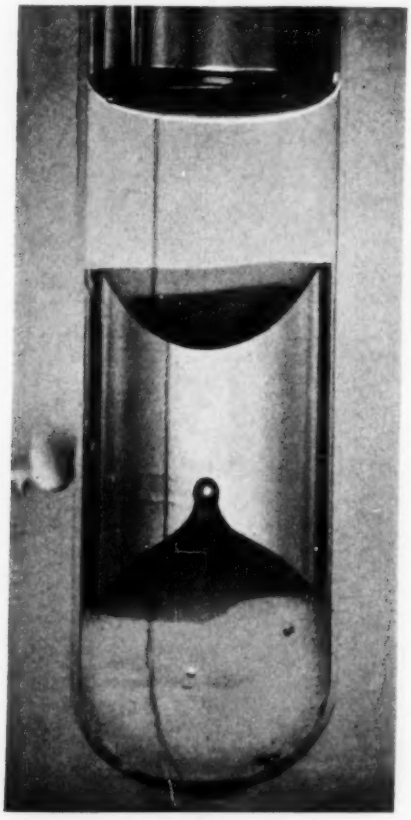

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Fig. 13.—Acetophenone under water. Pendant drop of acetophenone above.
Fig. 14.—The same after some hours, some acetophenone poured upon the pendant drop remains there, because it wets there the glass wall at once. A small pendant bubble has formed at the lower interface acetophenone-water.

gradual wetting and the mutual displacement of the liquids. These observations completely confirmed our previously discussed views on the formative origin of the abnormal drop formation.

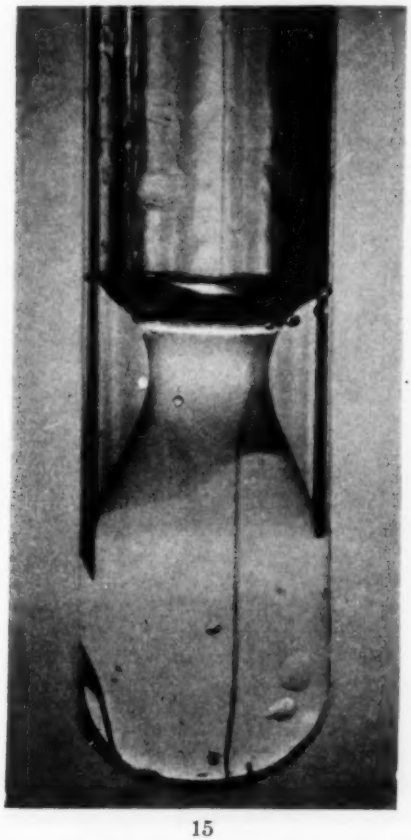
5. METHOD OF RENDERING WETTING VISIBLE.

The observation arrangement was very similar to that used by the authors in a previous study on the shape of menisci.[1] The experimental tube (a test-tube of

[1] John Uri Lloyd, Wo. Ostwald and W. Haller, JOUR. A. PH. A., 18 (1929), 862.

Jena glass) was placed into a basin with plane-parallel walls, which was filled with a mixture of benzylbenzoate and xylol. The mixture was so adjusted that it had the same refractive index as the glass, the contours of which were therefore hardly visible. The experimental tube was illuminated by an incandescent lamp, and the light rendered as diffused as possible by means of a paper screen put into the liquid in the basin; the photographs were taken from the other side.

The advantage of this arrangement was that now the edge parts of the tube



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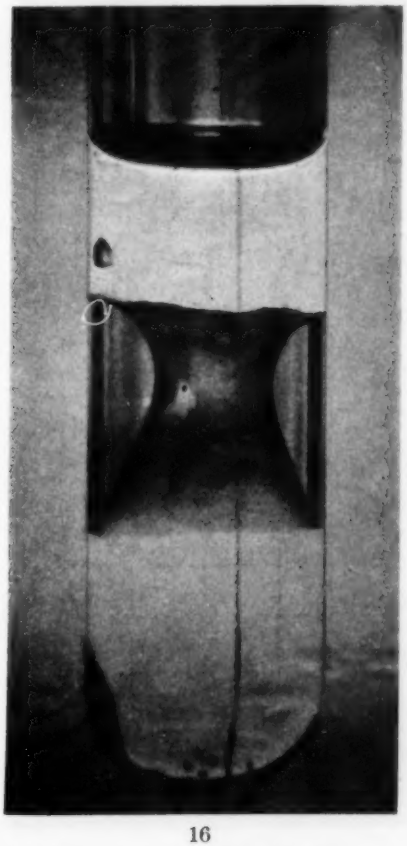

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Fig. 15.—From the middle layer of water in Fig. 14 some quantity has been taken off. Finally the two layers of acetophenone touched one another and united, the water remaining as a wetting drop at the glass wall. Fig. 16.—The same, some acetophenone poured upon the wetting drop.

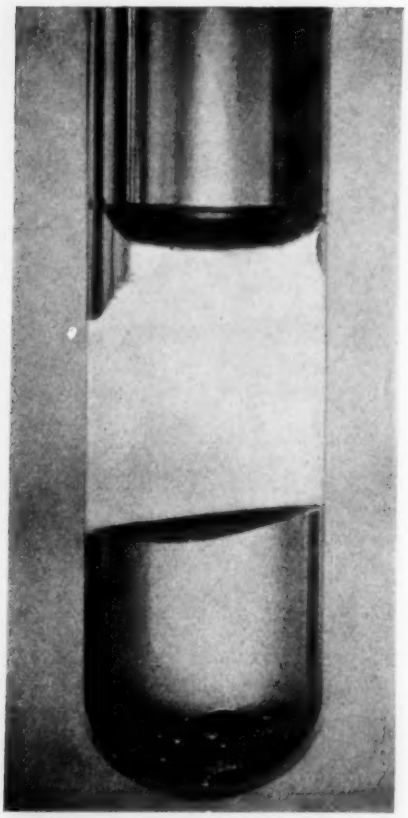
became very distinctly visible, while with ordinary illumination they were not recognizable on account of the strong refraction and reflection of light. By the imbedding into a medium of the same refractive index as glass, optical distortion was reduced to a minimum, therefore deceptive impressions concerning the form of interfaces were excluded.

Of quite especial advantage for our investigations was the fact that there appeared at the edge between liquid and glass wall, narrow dark bands (strips) caused by total reflection. Their width varied from liquid to liquid, which enabled

us to recognize with exactness which of the liquids wetted the glass wall. This test was exceedingly sensitive. Even traces of the wetting liquid in the form of thin and otherwise invisible films adhering to the glass wall were revealed by the dark band.

6. A collection of a few photographs obtained by this method is included in this contribution.

Figs. 1–4.—Nitrobenzol was poured into water; in part it settled at the bottom,



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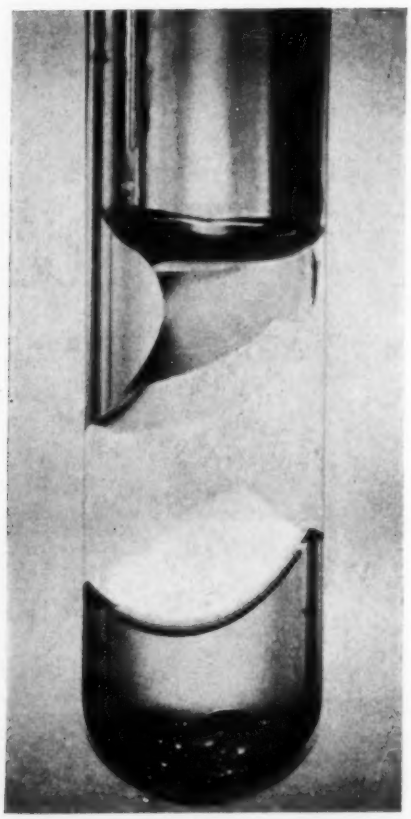

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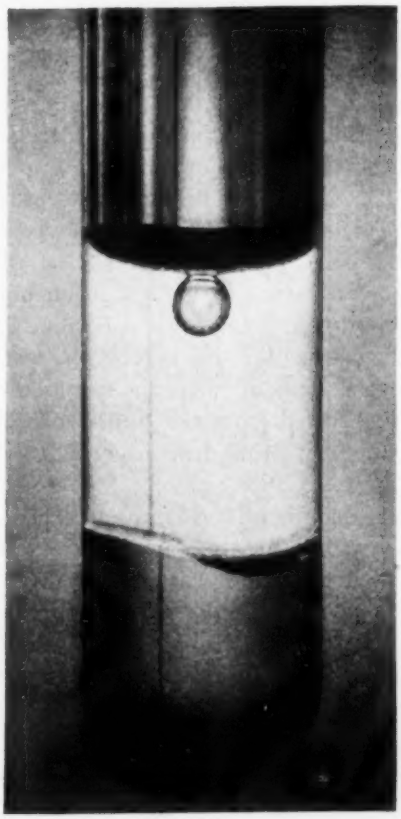
Fig. 17.—Water was placed under a layer of acetophenone with a fine pipette. The water remains below, although it has less gravity than acetophenone. It is held by the hysteresis of wetting. Fig. 18.—The same, but some of the water has now escaped and ascended. This was the result of a path being made by purposely wetting the glass with a wet glass rod. The ascended water forms a half wetting drop.

another part remained at the surface in the form of a pendant drop (*Fig. 1*). Nitrobenzol does not wet as well as water, and a long time elapsed before the water film between the nitrobenzol layer and the glass wall was displaced. This may be recognized by the dark zones in *Figs. 1–3*. Traces of water remained, which are seen in the form of small black specks at the edge. After one day some nitrobenzol was removed from the lower layer by means of a fine pipette; it was now plainly seen that nitrobenzol firmly adhered to the glass, for many small nitrobenzol droplets remained suspended at the wall (*Fig. 4*).

Figs. 5–9.—Especially striking was the hysteresis of wetting when chlorobenzol and water were used. In *Fig. 5*, chlorobenzol forms the lower layer, and a pendant drop but wets the glass only at a small spot at the bottom. After 1 day, a little more chlorobenzol was poured on top of the pendant drop; now it wetted the glass wall at once, because the latter had meanwhile become dry in the air; but below, a large water film still persisted between chlorobenzol and glass (*Fig. 6*). To the lower layer a large quantity of chlorobenzol was now added by means of a pipette, causing all menisci to move upward. It is plainly seen that chlorobenzol also is



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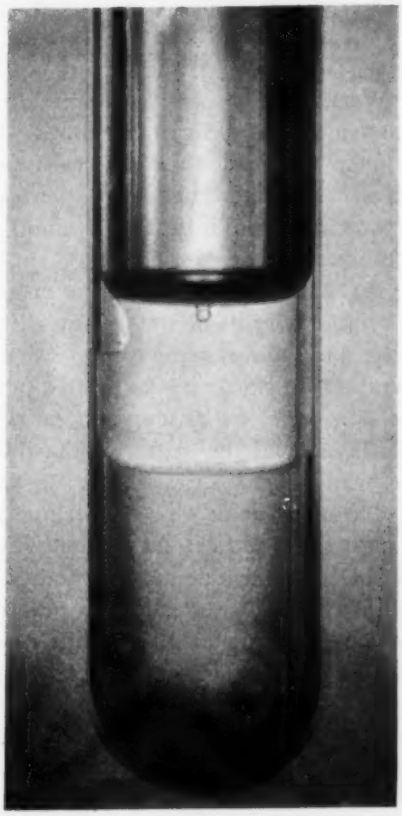

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Fig. 19.—Pendant drop of water above liquid paraffin. Fig. 20.—Pendant drop of water above amylalcohol. Both are exceptions of the theoretical rules of stability. They can only exist under certain conditions. The liquids must not be disturbed and the pendant drop must not come into contact with the glass wall.

displaced from the glass wall with difficulty after it has once wetted it. For this reason, the retreating meniscus of chlorobenzol was curved somewhat concave to water (*Fig. 7*), while normally it is convex.

The tensions involved in the wetting displacement of chlorobenzol were so great that under certain conditions they led to peculiarly distorted formations. *Fig. 8* arose from *Fig. 7* simply upon the addition of a little water by means of a pipette in the space between the two chlorobenzol layers, while in *Fig. 9*, a large quantity of chlorobenzol was added.

Figs. 10–15.—Figs. 10–12 show the phenomenon of the wetting drop in the example, acetophenone-water. A little water was added to acetophenone. It wetted the glass and moved along the wall between the acetophenone and the glass, visible by the progress of the dark zone, forming a wetting drop (*Fig. 10*). More and more water was added (*Fig. 11*) until the wetting drop finally coalesced into a massive layer (*Fig. 12*). A small part of the acetophenone always remained suspended above the water as a pendant drop, in harmony with the fact that a pendant drop always forms when a wetting drop is capable of being formed.

7. CHANGE OF WETTING DROPS INTO PENDANT DROPS.

Wetting drop and pendant drop are closely related. Theoretically, the same conditions prevail for both, concerning the magnitude of the interface tensions; therefore they always appear with the same pairs of liquids. Experimentally we find that they permit of being converted one into the other, the wetting drop into the pendant drop and vice versa, as we shall see in the following figures.

Fig. 13 is a pendant drop of acetophenone over water. A little acetophenone was poured over it; it wetted the glass wall perfectly, as the latter had become dry on standing, and remained in position above the water (*Fig. 14*). Now the water was taken out slowly by means of a pipette up to the moment where the two menisci touched. The layers merged, the acetophenone flowed from the upper into the lower layer, and the water remained in the form of a wetting drop adhering to the glass wall (*Fig. 15*).

Through the process of wetting, the wetting drop is rather firmly attached to the glass wall, and can move alongside of it only with difficulty. For this reason a layer of acetophenone may be poured upon it without causing the wetting drop to rise (*Fig. 16*). By means of a pipette a layer of water may be placed beneath a layer of acetophenone. The water will be held fast by wetting, remaining below although it is the lighter of the two liquids (*Fig. 17*). It is only when we move the tip of a wet glass rod along the wall, that the water will find an exit upward at this spot, indeed only for a short time. Soon there will be again a closed wetting ring of acetophenone, and the rest of the water remains below, while the water that has risen forms a wetting drop (*Fig. 18*).

8. In conclusion, let us consider a remarkable case of exception as to pendant drops. Ordinarily, a pendant drop can form only when its wetting ability is inferior to that of the other liquid. The reason for this is very simple; if it wetted the glass wall, it would form there a wetting drop, and would gradually flow downward along the wall. If a liquid is to form a pendant drop, it must not wet the wall. This end may be attained in different ways: either its wetting tension is smaller than that of the other liquid, which is the normal case; or the other liquid in consequence of hysteresis (lag) adheres with exceeding firmness to the wall, so that it cannot be displaced even though its wetting tension is smaller.

Thus, for example, we may put paraffin oil into a perfectly dry glass tube and place on its surface a drop of water. In this case, hysteresis is so strong that a pendant drop results (*Fig. 19*), although the water has a much greater wetting tension than the paraffin oil. A similar experiment succeeds with amylalcohol and

water (*Fig. 20*). In all these cases, however, equilibria are not attained; the phenomena are those of non-stability.[1]

SUMMARY.

The physical conditions under which pendant and wetting drops are formed, are discussed in detail. From theoretical considerations, we conclude that these formations are stable only if the various interface tensions involved satisfy definite conditions. Of especial importance is the magnitude of the wetting tensions.

In order to test the correctness of the theoretical conclusions, the subject of wetting is investigated in some detail. The known methods of measuring the wetting tension are discussed, and a new method is described, which overcomes certain difficulties of the methods heretofore in use. A few results of the measurements by this method are recorded.

The study of the wetting phenomena invariably shows that wetting is a complicated process, which cannot be characterized by the magnitude of wetting tensions alone. For this reason, wetting was studied more in detail, from its experimental aspect as a phenomenon.

To this end, a special optical arrangement was worked out, by the aid of which, wetting in glass tubes may be rendered very plainly visible. The method also permits proving the existence of very thin wetting films which otherwise could not be seen. The origin of pendant and wetting drops is very closely bound up with the behavior of these wetting films, which is shown in a series of photographs.

The earlier published observations of the senior author were confirmed in every respect.

THE STABILIZATION OF SOLUTION OF ARSENOUS AND MERCURIC IODIDE, U. S. P. X.*

BY WILLIAM J. HUSA.**

RELATION BETWEEN STABILITY AND p_H.

Historical Review.—In 1903, William Duncan (1) reported that the tendency of Donovan's Solution to liberate iodine could be checked by adding sufficient alkali to neutralize the free hydriodic acid, and suggested this method for adoption in the British Pharmacopœia. His suggestion did not receive favorable consideration. Guyot (2) offered this same suggestion for checking the deterioration of a solution of arsenous iodide. In confirmation of these reports, Husa and Enz (3) found that Donovan's Solution was more stable near the neutral point, the rate of deterioration increasing with increasing acidity or basicity.

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[1] The contrast between these exceptions and the regular phenomenon may probably be characterized as follows:

The normal phenomena depend solely on the values of the interface tensions, regardless of the order in which the two liquids are mixed. With the 2 anomalies described, exactly the same order of superposition must be observed in order to be successful. Contact of the pendant drop with the glass wall must be especially avoided, because as soon as contact takes place, the laws we derived concerning the magnitudes of interface tensions will go into effect, tending to stability.

* Presented before the Scientific Section, A. PH. A., Miami, Fla., 1931.

** Professor of Pharmacy, University of Florida.

Experimental Data.—As the literature contains no data on the exact relation between the stability and p_H of this solution, experiments were carried out to supply this information. Tests were made of the stability of a series of solutions adjusted to different p_H values by the addition of KOH. In order to have the Donovan's Solution of U. S. P. strength after the addition of the base, the solution was first made up of double strength. In each case, 250 cc. of double strength solution was placed in an 800-cc. beaker fitted with a mechanical stirrer, and the specified number of cc. of approximately $N/2$ KOH was slowly run in from a burette with vigorous stirring. Then distilled water was added q. s. 500 cc. The tests were carried out in dark amber-colored, cork-stoppered bottles in diffused light, each bottle containing 400 cc. of solution. It was found essential to add the base slowly and with vigorous agitation as described, for otherwise the KOH caused the solution to become cloudy, due apparently to precipitation of a basic mercury salt.

The p_H was determined colorimetrically and the assay for arsenous iodide was carried out by the U. S. P. method. After a period of approximately six months, the solutions were again analyzed for trivalent arsenic with results as follows:

TABLE I.—RELATION BETWEEN STABILITY AND p_H.

No. of Cc. of Approx. $N/2$ KOH Used in 500 Cc. of Solution.	p_H Determined Colorimetrically.	Deterioration after 177 Days (% of As^{III} Oxidized to As^{V}).
None (control)	1.2	46.9%
50.0 cc.	1.5	27.2%
75.0 cc.	2.0	21.5%
88.3 cc.	3.4	12.2%
88.8 cc.	4.8	9.4%
89.1 cc.	5.6	5.9%
89.3 cc.	6.3	0%
89.5 cc.	6.9	0%
90.0 cc.	7.5	0%
91.2 cc.	7.8	0%

The results in Table I indicate that with increasing p_H values (decreasing concentration of H ions) the stability increased and that in the p_H range from 6.3 to 7.8 there was no deterioration whatever in approximately six months. These results were verified by another similar experiment in which there was no deterioration in seven months in solutions adjusted to a p_H of between 6.0 and 8.0.

The fact that the hydriodic acid in Donovan's Solution need not be completely neutralized to assure stability is in accord with the results obtained by Husa and Shattuck on solutions of pure hydriodic acid. These results, which are being reported in another paper, indicate that when HI is diluted to $N/100$ and $N/1000$, it becomes unusually stable. On the alkaline side, the present tests did not go beyond a p_H of 8.0, but in more alkaline solutions the stability would be poorer as the oxidation of trivalent arsenic by atmospheric oxygen becomes a factor in alkaline solutions; the earlier results of Husa and Enz (3) bear this out.

Since by adjusting the p_H the deterioration was reduced from about 50% to 0%, the advisability of changing the p_H of this solution should be seriously considered for adoption in the U. S. P. XI. A suitable p_H range for official adoption

would be from p_H 6.5 to 7.5. This would allow for minor variations and would still be within the p_H range in which Donovan's Solution is stable.

Adjustment of p_H by a Simple Method.—Since the exact adjustment of p_H by addition of KOH solution, using the colorimetric method, is a rather tedious process which is not very well suited for use in the retail pharmacy, an effort was made to devise a simpler process. It was evident that the use of a strong base, such as KOH, would necessarily require extreme care in manipulation, since a small quantity of strong base causes a great change in p_H near the neutral point, and since a local excess of KOH in the solution causes precipitation. This method could easily be used on a factory scale with adequate chemical control but would hardly be suitable for the average retail pharmacist under present conditions.

It was concluded that the best possibility for a reliable extemporaneous method of adjusting the p_H would be a method of neutralizing the solution by the mere addition of a weighed quantity of some commonly available substance of low cost, of adequate neutralizing power yet of feeble alkalinity (so that a slight inaccuracy in weighing would not vitiate the results, and a local excess would not cause precipitation); furthermore such a substance should be unobjectionable therapeutically. When the problem was once visualized from this standpoint, the only step remaining was to find a substance having this combination of desirable properties, and to establish the proper conditions for its use.

In approaching the problem of finding a substance having the desired combination of properties, some alkaline substances such as hydroxides, and certain borates and phosphates were eliminated from consideration for obvious reasons. In considering the relative value of carbonates and bicarbonates, particularly those of sodium and potassium, it was apparent that the bicarbonates would require less accurate weighing, both on account of the feebler alkalinity and because of the larger quantity required to neutralize a given amount of acid.

Tests were made of the use of sodium bicarbonate, U. S. P. X, powder, and potassium bicarbonate, U. S. P. X, granular, as materials for adjusting the p_H of Donovan's Solution. The p_H of solutions of these compounds was determined colorimetrically to see whether there was any difference in alkalinity. The solutions were made up on a weight to volume percentage basis and the results were as follows:

TABLE II.—p_H OF SOLUTIONS OF $NaHCO_3$ AND $KHCO_3$.

Percentage Strength of Solution.	p_H Values of $NaHCO_3$ Solutions.	p_H Values of $KHCO_3$ Solutions.
4.0	8.6	8.1
2.0	8.6	8.1
0.1	8.6	8.0
0.01	7.8	7.3
0.001	6.3	

NOTE: The distilled water used had a p_H of 5.6.

The results in Table II indicate that $KHCO_3$ is slightly less alkaline, weight for weight, than $NaHCO_3$.

After some preliminary tests, a series of solutions was prepared as follows: The specified amount of $NaHCO_3$ or $KHCO_3$ was added to 250 cc. of double strength Donovan's Solution in a beaker; after effervescence ceased, distilled water was

added q. s. 500 cc. The tests were carried out in 500-cc. dark amber-colored bottles in diffused light, each bottle containing 430 cc. of solution at the start of the experiment; 50-cc. portions were withdrawn for analysis after 101 days and 174 days. The results were as follows:

TABLE III.—STABILITY AND p_H OF DONOVAN'S SOLUTION WITH ADDITION OF $NaHCO_3$ AND $KHCO_3$.

Material Added per Liter.	Original p_H.	p_H After 101 Days.	p_H After 174 Days.	Percentage Deterioration	
				101 Days.	174 Days.
6.0 Gm. $NaHCO_3$	5.9	5.9	6.0	0	1.0
8.0 Gm. $NaHCO_3$	6.7	6.7	6.9	0	0
10.0 Gm. $NaHCO_3$	6.9	6.9	7.1	0	0
Control (no addition)	1.2	1.2	1.2	18.6	36.8
7.2 Gm. $KHCO_3$	5.8	5.9	5.9	0	0.03
9.6 Gm. $KHCO_3$	6.6	6.6	6.7	0	0
12.0 Gm. $KHCO_3$	6.8	7.0	7.2	0	0

The results in Table III indicate that both $NaHCO_3$ and $KHCO_3$ are suitable agents for adjusting the p_H of Donovan's Solution to the range of stability. The slight rise in p_H values which occurs on standing is doubtless caused by loss of CO_2. It is thus apparent that the p_H of the solution may be adjusted by simply weighing out and adding a portion of $NaHCO_3$. For a liter of Donovan's Solution, 9.0 Gm. of $NaHCO_3$ will give proper results, and if as low as 8.0 Gm. or as much as 10.0 Gm. were used the p_H would still be within the recommended range of p_H 6.5 to 7.5. We thus have an extemporaneous, fool-proof method suitable for adoption in the U. S. P. XI. The formula and directions for the preparation of a liter of Donovan's Solution of adjusted p_H would be as follows:

Arsenous iodide		10 Gm.
Red mercuric iodide		10 Gm.
Sodium bicarbonate		9 Gm.
Distilled water	q. s.	1000 cc.

Triturate the arsenous iodide and red mercuric iodide in a mortar, add 150 cc. of distilled water, and continue the trituration until solution is effected. Filter the solution, and pass sufficient distilled water through the filter to make the filtrate measure 500 cc. Place the filtrate in an open vessel, and add the sodium bicarbonate. When effervescence has ceased, filter if necessary, and add sufficient distilled water to make the product measure 1000 cc. Mix thoroughly.

The results by the above method were distinctly better than could be obtained by triturating all three solids with water.

EFFECT OF COLOR OF GLASS CONTAINER ON STABILITY.

The U. S. P. X directs that Donovan's Solution be preserved in well-filled, amber-colored bottles. Husa and Enz (3) reported that the stability was increased by: (*a*) storage in amber bottles; (*b*) storage in well-filled bottles; (*c*) storage in a refrigerator; (*d*) replacement of the air in the bottle by an inert gas. Contrary to these statements, however, Acton (4) determined the rates of deterioration in bottles of amber-colored glass and colorless glass under conditions of exposure to sunlight and protection from sunlight, and came to the conclusion that there was not sufficient difference in these rates of deterioration to warrant any unusual care in the storage of the solution.

On account of these conflicting statements, further experiments were carried out on this point in the present investigation. The results with Donovan's Solution stored under various conditions were as follows:

TABLE IV.—PERCENTAGE DETERIORATION AFTER 8 WEEKS. 200 CC. DONOVAN'S SOLUTION IN EACH BOTTLE.

Conditions of Storage.	Percentage Deterioration in Following Kinds of Bottles: Amber-colored, 240 cc. capacity.	Colorless, 293 cc. capacity.	Greenish tint, 267 cc. capacity.
Diffused light	15.9	17.0	14.7
Sunlight (inside of window)	19.2	44.4	34.0
Sunlight (on roof)	16.5	64.9	56.8

In experiments of this character the amount of air in the bottles is an important factor. In the results given in Table IV, the different colored bottles cannot be compared directly because of the differences in capacity, but the results with each kind of bottle should be compared under the different conditions. Thus in amber bottles the rate of decomposition in sunlight was only slightly greater than in diffused light, while with colorless or greenish bottles the rate of deterioration in direct sunlight was about four times as great as in diffused light. These tests show clearly and conclusively that amber-colored bottles of proper quality offer great protection to Donovan's Solution. The U. S. P. is therefore justified in continuing to direct storage of Donovan's Solution in amber-colored bottles. The words "proper quality" are used advisedly since it is known that some amber-colored bottles are no better than colorless bottles in keeping out the deleterious shorter light waves. It should not be expected that amber-colored bottles should show any particular advantage in diffused light, nor is it assumed that pharmacists would ordinarily place the solution where it would be exposed to direct sunlight. But when it does happen that the solution is exposed to shorter light waves, the amber-colored bottle will give protection. In other words the amber-colored bottle gives protection when protection is needed, which is as it should be.

COMMENTS ON ASSAY FOR TOTAL ARSENIC.

In connection with various arsenical solutions which undergo oxidation, it has frequently been suggested that the assays for trivalent arsenic be replaced by assays for total arsenic. The Pharmaceutical Chemistry Sub-Committee has recommended (5) that in the next British Pharmacopœia, Donovan's Solution should be assayed for total arsenic.

The objection to such assays for total arsenic lies in the great variability which such an assay would allow. If we grant that the relative therapeutic value of trivalent and pentavalent arsenic is a problem for the clinician to decide, yet it may be questioned whether it is good pharmacy to officially approve solutions in which the total arsenic may be in from 0 to 100% in the trivalent form and from 0 to 100% in the pentavalent form.

FURTHER TESTS OF NEW METHOD OF PREPARATION.

Husa and Enz (3), (6) devised a new method for the preparation of a neutral modified Donovan's Solution in which As_2O_3 was dissolved in HCl, and the solution then neutralized; the HgI_2 was dissolved in KI solution and the two solutions were mixed. This solution was much more stable than U. S. P. Donovan's

Solution. In the present investigation, a further study was made of this method to determine its general suitability and also particularly to determine how its stability compared with that of carefully neutralized Donovan's Solution made from AsI_3 and HgI_2. The details for the preparation of the modified solution are given in an earlier paper (3).

TABLE V.—COMPARATIVE STABILITY OF DONOVAN'S SOLUTION, MODIFIED DONOVAN'S SOLUTION AND NEUTRALIZED DONOVAN'S SOLUTION.

Solution Stored in Diffused Light.	p_H.	Per cent Deterioration After 35 Days.	Per cent Deterioration After 224 Days.
Donovan's Solution in colorless g.s. bottle	1.2	1.9	20.1
Donovan's Solution in amber-colored g.s. bottle	1.2	1.9	18.7
Neutralized Donovan's Solution in colorless g.s. bottle	6.9	0	0
Neutralized Donovan's Solution in amber-colored g.s. bottle	6.9	0	0
Modified Donovan's Solution in colorless g.s. bottle	7.1	0	0
Modified Donovan's Solution in amber-colored g.s. bottle	7.1	0	0

The results in Table V indicate that both the neutralized Donovan's Solution of p_H 6.9 and the modified solution of p_H 7.1 prepared by the method of Husa and Enz are stable, no deterioration having been observed after about seven months. The neutralized solution has the advantage of being a little easier to prepare, while the modified solution of Husa and Enz has the advantage of avoiding the use of arsenous iodide, which is variable in composition and difficult to preserve.

SUMMARY.

1. The stability of Donovan's Solution is greatly increased by neutralizing with KOH to a p_H of 6.0 to 8.0. A suitable p_H range for adoption by the U. S. P. XI is from p_H 6.5 to 7.5.

2. Since the exact adjustment of p_H by addition of KOH solution, using the colorimetric method, is a rather tedious process which is not very well suited for use in the retail pharmacy, an effort was made to devise a simpler process. It was found that the addition of 9.0 Gm. of $NaHCO_3$ per liter will give the proper p_H. This method could readily be carried out by the average retail pharmacist and is therefore recommended for adoption by the U. S. P. XI.

3. Contrary to the report of Acton, the U. S. P. is justified in directing storage in well-filled, amber-colored bottles in the case of this solution.

4. An assay for total arsenic rather than for trivalent arsenic is deemed inadvisable.

5. Modified Donovan's Solution made by the method of Husa and Enz is stable and avoids the use of arsenous iodide, which is variable and difficult to preserve.

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(2) Guyot, *Bull. soc. pharm. Bordeaux*, 63 (1925), 214–216; through *Chem. Abstr.*, 20 (1926), 965.

(3) William J. Husa and W. W. F. Enz, JOUR. A. PH. A., 19 (1930), 328–341.

(4) Morris G. Acton, Jr., *Am. J. Pharm.*, 102 (1930), 159–164.

(5) *Pharm. J.*, 126 (1931), 523.

(6) William J. Husa and W. W. F. Enz, JOUR. A. PH. A., 19 (1930), 1228–1230.

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RESIN OF IPOMEA.*

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INTRODUCTION.

Resin of ipomea is the chief therapeutic constituent of *Ipomœa orizabensis* Ledenois. It is described in the Pharmacopœia of the United States,[1] and a method for its preparation from the crude drug is given. The resin is rarely prescribed alone but it is a constituent of Compound Extract of Colocynth U. S. P.[2] and of Compound Tincture of Jalap N. F. V.[3] Also it enters into the composition of many unofficial preparations.

Criticisms were received by the Food and Drug Administration that resin of ipomea of authentic origin did not conform in all respects to the standards of the U. S. P. X. It was claimed that the maximum moisture limit permitted by the Pharmacopœia (1%) is too low, since most specimens contained from 2% to 3% of moisture. Some analysts reported that the determination of moisture in the product gave considerable trouble because the dried product is very hygroscopic. In general it was asserted that the limits for the acid number (25–30), the saponification number (195–215) and ester number (170–185) as specified in the Pharmacopœia are much too high; it was also claimed that the U. S. P. requirements for ether solubility (from 80 to 90% ether-soluble) cannot always be met. Because of the importance of the subject from the standpoint of the administration of the Food and Drugs Act, an investigation of the properties of resin of ipomea was undertaken.

REVIEW OF LITERATURE.

Several investigators have studied resin of ipomea and much of the information in the literature concerning its constants is confusing and contradictory.

Resin of ipomea appears to have been first isolated by Planche and Ledenois.[4] Other early investigators were Mayer[5] and Spirgatis.[6] Flückiger and Hanbury[7] found 11.8% of resin in orizaba root. They stated that the resin had an optical rotatory value of —19.6° in alcohol. Under the same conditions convolvulin (from true jalap) had a value of —11.6°. They stated that the pure resin is completely soluble in ether.

Weigel[8] found 6.4 to 22.2% of resin in 14 specimens of orizaba root. About 82% of the resin obtained was soluble in ether.

Deane[9] obtained the resin from Mexican scammony root by exhausting the drug with alcohol, evaporating the solvent and pouring the residue into water. The resin was purified by washing repeatedly with hot water. A yield of 18.5%

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* Scientific Section, A. PH. A., Miami meeting, 1931.

** Food and Drug Administration, Washington, D. C.

[1] Pharmacopœia of the United States of America, 10 (1926), 319.

[2] *Ibid.*, 144.

[3] The National Formulary, 5 (1926), 254.

[4] *Jour. Chim. Med.*, 10 (1834), 1.

[5] *Ann.*, 95 (1855), 129.

[6] *Ibid.*, 116 (1860), 289; 139 (1866), 41.

[7] "Pharmacographia," 2nd Edition (1879), 446.

[8] *Pharm. Zentralhalle*, 44 (1903), 789.

[9] *Pharm. J.*, 72 (1904), 327.

was obtained. The color of the resin was pale brown. Over 98% of it was soluble in ether.

Duncan[1] reported that a sample of Mexican scammony which he assayed yielded 16.5% of resin but that a picked root from the same lot yielded 20.1%. The resin resembled that from true scammony except in respect to its melting point and saponification value. This resin melted at 110°, whereas the true scammony resin melted at 119°. The respective saponification numbers were 149.3 and 196.2.

Cowie and Brander[2] examined a specimen of resin of Mexican scammony which they had prepared from crude drug believed to be *Ipomœa orizabensis* and two specimens of the commercial resin. They found from 2 to 3.05% of moisture; from 0.16 to 0.20% of ash, and from 68.6 to 72% soluble in ether. The acid value was 8.4 and the saponification values 295 to 327. The optical rotatory values of two specimens were —18.75° and —27.0°.

Taylor[3] examined two specimens of resin of Mexican scammony believed to be pure and one which he believed to be nearly pure. He reported from 1.77 to 2.03% of moisture, 0.08 to 0.22% of ash, 14.6 to 21.5 for acid values, 186.6 to 198.4 for saponification values, from 171.1 to 183.8 for ester numbers and from 8.7 to 11.5 for iodine absorption values. In the determination of acid number and saponification number Taylor noted that the solution became so dark that it was difficult to determine the end-point. He overcame this difficulty in part by using larger amounts of phenolphthalein solution as indicator. He also observed that the resin soaps formed in the saponification were not very soluble in the alcoholic solution They had a tendency, therefore, to settle to the bottom of the flask with resultant occlusion of alkali. He diluted the soap solution with water before titration, which overcame the difficulty to some extent. Taylor believed that the saponification values sharply distinguish the orizaba resin from resin of true scammony, the latter having a saponification value of from 230–240. He considered the acid number and the iodine absorption number of no value in distinguishing between the two resins.

Weigel[4] disagreed with Taylor[3] that the resins of scammony and ipomea may be distinguished by their saponification numbers. He reported that eight samples of resin of ipomea had saponification values of from 179.71 to 228.68. He believed that Taylor's findings for acid and saponification numbers of true scammony resin were too high. Weigel found that the saponification value of ipomea resin is lower if the back titration were conducted in the hot solution. Two specimens, back titrated hot, gave, respectively, 162.8 and 184.8 for saponification values. The same specimens, each titrated cold, gave, respectively, 182.0 and 210.6. He recommends that the back titration be made in the hot solution. He believes that the resin should be free from water-soluble material.

Engelhart and Schmidt[5] examined five specimens believed to be resin of ipomea, together with several specimens known to be true resin of scammony. For the resin of ipomea they found from 1.45 to 4.29% of moisture, from 0.07 to 0.3% of ash, acid values of from 10.2 to 14.9, saponification numbers of from 171.6

[1] *Pharm. J.*, 80 (1908), 378.
[2] *Ibid.*, 81 (1908), 366.
[3] *Am. J. Pharm.*, 81 (1909), 105.
[4] *Pharm. Zentralhalle*, 51 (1910), 721.
[5] A. PH. A. PROCEEDINGS, 58 (1910), 1025.

to 183.8, ester numbers of from 157.6 to 170.2, iodine absorption numbers of from 11.48 to 13.93, optical rotatory values of from —31.31° to —34.27° and ether solubility of from 80.9 to 91.5%. They compared these findings with the corresponding results from true resin of scammony. Examination of their findings shows that the saponification numbers, the optical rotatory values and the solubilities in ether are the only factors of value in distinguishing between the two resins. In determining the acid number Engelhart and Schmidt used the method of Marks.[1] This consists in making the titration in a flat-bottomed porcelain dish. The solution is thus brought against a white background in a thin layer, which facilitates the determination of the end-point.

During the chemical examination of the root of Mexican scammony, Power and Rogerson[2,3] obtained 14.55% of the resin. Of this 71% was soluble in ether. After treatment with animal charcoal the resin was colorless. The decolorized resin was levorotatory; α_D — 23.0°. The resin melted at 125° to 130° C.

EXPERIMENTAL.

Twelve specimens of resin of ipomea were obtained from manufacturers or users of the drug and three laboratory specimens were prepared from the crude drug which had been authenticated by Mr. J. F. Clevenger, Administration Pharmacognosist. In preparing one of these specimens the U. S. P. X process for making resin of ipomea was followed and in the other two the resin was prepared by extracting the ground drug with alcohol in an automatic extraction apparatus, evaporating the extract to dryness, and washing the residue with successive portions of hot water.

Moisture, ash, acid number,[4] saponification value,[4] ester number and ether solubility were determined. With certain exceptions as noted later, the methods described in the U. S. P. X were employed. No attempt was made to determine the iodine absorption value, for it had been shown by previous workers* that this factor is of no value in distinguishing between resin of scammony and resin of ipomea. The optical rotatory values were not observed. Cowie[5] had shown that the optical rotatory value of pure scammony resin (scammonin) was about —25°. This value is so near that of ipomea resin that this property cannot be utilized in distinguishing between the two resins. In addition, the material insoluble in alcohol and the substances soluble in water were determined. Tests for aloin, guaiac, resin and soluble impurities were also carried out according to the U. S. P. X methods.

During the first determinations of saponification number (in which the U. S. P. X method was followed) exceedingly variable results were obtained. A series of tests was then carried out in which the time of boiling, the quantity of sample taken and the concentration of the alkali were varied. In general it was found that the saponification number increased with the time of boiling (up to 2 hours) and with the concentration of the alkali. Also that the maximum saponification values

[1] *Chem.-Ztg.*, 34 (1910), 124.

[2] *Chem. Soc. Proc.*, 27 (1911), 304.

[3] *J. Chem. Soc.*, 101 (1911), 1. * See [3,5], preceding page.

[4] Alkali blue was found to be a more satisfactory indicator than phenolphthalein. This will be discussed later.

[5] *Pharm. J.*, 81 (1908), 365.

were not obtained by heating for 30 minutes as prescribed by the U. S. P. X method. As a result of these preliminary trials, a period of two hours was adopted as satisfactory for boiling the solution.

The alcoholic solutions of most of the specimens of resin were quite dark. When phenolphthalein was used as indicator it was difficult to ascertain the end-points in the determination of the acid numbers and the saponification numbers. The difficulty was not remedied by using aldehyde-free alcohol to dissolve the resins before saponification. Alkali blue was tried as an indicator with somewhat better success. In preparing this solution 0.25 Gm. of alkali blue (sodium triphenylpara-rosaniline monosulphonate) was dissolved in about 5 cc. of water and the solution diluted to 25 cc. with alcohol. Most of the results for acid values and saponification values recorded in Table I were obtained by the use of alkali blue as indicator.

In the determination of saponification numbers it was observed that a portion of the resin soaps was precipitated in the saponification flask. As previously mentioned, Taylor* had noted that a similar precipitate which he had obtained occluded some of the alkali. In order to reduce the error from this phenomenon in these studies the hot, alcoholic solution of soap and alkali was poured into a 2-liter Erlenmeyer flask and the back titration conducted nearly to neutrality. The resin soap remaining in the saponification flask was dissolved in about 1 cc. of water and the solution added to the partially titrated solution. The titration was then completed. By this procedure it is believed that all of the occluded alkali in the resin soap was brought into the reaction. Owing to the small quantity of water used for the solution of the resin soaps, and the subsequent dilution of the solution with a large excess of alcohol, the hydrolysis is thought to have been reduced to a minimum.

No particular difficulty was encountered in the determination of moisture and ash. Moisture was determined by drying in a flat-bottomed silica dish at 100° in a Freas oven. Ash was then determined by heating the silica dish and contents to low redness in a muffle.

After the preliminary experimentation, as outlined in the preceding paragraphs, had been completed, the following procedures (in addition to methods for the determination of moisture and ash) were adopted:

ALCOHOL-INSOLUBLE.

Weigh 10.0 Gm. of resin of ipomea into a beaker, add 50 cc. of neutral alcohol and warm the mixture gently with stirring until the resin is dissolved. Decant the liquid through a weighed Gooch crucible and wash the container with several small portions of neutral alcohol, taking care to transfer any insoluble material to the crucible. Wash the crucible and contents with several small portions of neutral alcohol. To insure complete extraction of the resin place the partially washed crucible and contents in a Bailey extractor[1] and extract with neutral alcohol to exhaustion. Dry the crucible to constant weight at 100° C. and weigh.

ACID NUMBER.

Transfer the alcoholic solution (obtained in the determination of alcohol-insoluble material) to a 250-cc. volumetric flask, make up to the volume with neutral alcohol and mix the solution well. Place 25 cc. of the solution (equivalent to 1 Gm. of resin of ipomea) in an acetylization

* See [3], page 218.

[1] *Ind. & Eng. Chem.*, 6 (1914), 497.

flask, add 1 cc. of alkali blue solution[1] and titrate the solution with 0.5 *N* alcoholic potassium hydroxide until a distinct, permanent, brownish red color appears.

Each cc. of 0.5 *N* KOH equals 0.02806 Gm. of KOH.

SAPONIFICATION NUMBER.

To the neutral, alcoholic solution of resin of ipomea as obtained in the preceding paragraph, add sufficient 0.5 *N* alcoholic potassium hydroxide to make a total of 15 cc. of the alkaline solution. Boil the mixture gently on the steam-bath for 2 hours with frequent agitation. Titrate the excess alkali with 0.5 *N* hydrochloric acid.

Each cc. of 0.5 *N* KOH = 0.02806 Gm. of KOH.

WATER-SOLUBLE.

Evaporate the alcohol from 25 cc. of the solution of the resin (equivalent to 1 Gm. of resin of ipomea), and dry the residue at 100° to remove the last portions of solvent. Add 15 cc. of water to the residue, bring the mixture to boiling, allow to cool about three minutes, and stir well with a flat-headed glass rod for two minutes to insure thorough washing of the resin. Cool the mixture to a temperature below 10° C. and decant the wash water into a 9-cm. filter paper. Repeat the washing of the resin with another 15-cc. portion of water, boiling and cooling the mixture, kneading the resin as before and decanting the washings onto the filter, as described previously. Repeat the washing and kneading process with hot water once more. Evaporate the aqueous filtrate and washings and dry the residue to constant weight at 100° C. Weigh the residue as "water-soluble."

The ester number is ascertained by subtracting the acid value from the saponification number. The analytical findings for the several specimens examined are given in the accompanying table.

TABLE I.—ANALYSES OF SEVERAL SPECIMENS OF RESIN OF IPOMEA.

Sample.	Moisture.	Ash.	Alcohol-Insoluble.	Acid Number.	Saponification Number.	Ester Number.	Water-Soluble.	Ether-Soluble.	Pet.-Ether-Soluble.
A	0.62	0.14	0.015	8.36	177.31	166.54	0.81	87.18	..
	0.65	0.13	...	8.36	177.31	166.81	0.80	...	..
	..	..	...	8.77	....	....	..	...	..
	..	..	...	8.50	....	....	..	...	..
B	1.39	0.19	0.051	9.06	186.04	176.98	1.19	...	..
	1.17	0.19	...	10.35	177.16	166.81	1.03	...	..
	1.38	0.18	...	10.35	182.90	172.55	..	...	..
	1.38	..	...	...	....	....	..	...	..
C	..	0.044	0.20	12.26	182.41	170.15	0.23	83.19	..
	..	..	...	12.26	182.45	170.19	0.24	82.65	..
	..	..	...	...	184.90	....	..	82.77	2.05
	..	..	...	...	181.93	....	..	...	..
D	2.42	0.07	0.24	9.01	188.67	179.66	0.22	96.26	2.05
	2.21	0.08	...	9.54	188.92	179.38	0.25	...	..
E	0.71	0.07	0.09	10.46	176.03	165.57	1.17	58.06	2.2
	0.73	0.06	0.06	11.88	172.58	160.70	1.28	58.22	..
	..	..	...	11.88	173.11	161.79	..	...	..
	..	..	...	11.32	171.31	....	..	...	..
F	1.25	0.24	0.38	14.82	190.46	175.64	3.62	81.53	..
	1.21	0.24	...	14.97	193.66	178.69	3.97	...	..
	..	..	...	13.46	195.13	181.67	..	...	..
	..	..	...	14.81	193.30	178.49	..	...	..

[1] Dissolve 0.25 Gm. of alkali blue in 5 cc. of water and add 20 cc. of alcohol.

G	3.39	0.55	2.76	9.12	173.38	164.26	1.97	80.40	1.82
	3.37	0.56	2.75	8.34	172.86	....	1.88	...	..
	..	..	...	...	171.13	162.79	..	...	..
H	1.60	0.38	0.51	13.41	186.62	173.21	2.82	79.76	3.48
	1.62	0.29	...	12.07	185.26	173.19	2.72	80.68	..
	..	0.44	...	13.41	....	....	..	...	..
	..	0.44	...	...	....	....	..	...	..
I	3.10	0.18	0.38	17.70	185.34	167.64	2.38	74.56	2.05
	3.71	0.19	...	17.70	187.90	170.20	2.42	76.12	..
	3.71	0.19	...	17.70	185.30	167.60	..	...	..
J	2.98	0.27	0.35	9.55	175.52	165.97	2.78	85.20	2.10
	3.25	0.25	...	9.55	175.52	165.97	3.37	...	..
K	3.21	1.00	0.61	11.49	172.41	160.92	5.95	69.06	1.70
	3.25	1.00	0.73	11.49	172.41	160.92	5.98	69.68	..
L	3.36	0.83	0.59	11.48	183.82	172.34	5.78	66.44	2.10
	3.35	0.84	0.55	11.23	182.41	171.18	7.49	63.72	..
	..	..	...	10.70	....	....	6.48	...	..
M	2.14	0.20	0.13	9.92	181.06	171.14	2.40	81.10	3.06
	2.15	0.20	...	9.39	178.29	168.90	3.90	...	..
	..	..	...	9.39	....	....	2.31	...	..
N	3.19	0.55	1.17	10.53	172.23	161.70	6.38	51.46	2.88
	3.21	0.54	...	10.56	173.56	163.00	6.41	51.04	..
	..	..	...	11.05	172.24	161.19	..	...	..
O	5.23	1.03	0.97	13.43	190.45	177.02	7.45	72.08	2.3
	5.17	1.03	...	13.82	190.45	176.63	6.09	72.06	..
U. S. P. requirements	1.0	0.5	...	25–30	195–215	170–185	..	80–90	5.00

Jois, Manjunath and Rao[1] have worked out a method for determining the saponification value and the acid value of highly colored oils which they claim is much more satisfactory than the ordinary process. Their method as applied to oils is as follows:

> Heat from 1 to 1.5 Gm. of the oil with a measured excess of 0.5 *N* alcoholic potassium hydroxide for half an hour in a reflux apparatus. Add 50 cc. of toluene, 25 cc. of neutral, saturated sodium chloride solution, 5 Gm. of solid sodium chloride (to prevent dilution of the salt solution during addition of the acid) and 1 cc. of phenolphthalein T.S. Titrate the excess of alkali with 0.5 *N* hydrochloric acid, heating the mixture on the water-bath toward the end of the reaction. Conduct a blank experiment with the same quantities of reagents and apply the necessary correction.
>
> Each cc. of 0.5 *N* KOH = 0.02806 Gm. of KOH.

This method was tried out on a few specimens of resin of ipomea, the saponification numbers of which had already been determined by the use of alkali blue as indicator. Some difficulty in ascertaining the end-point was encountered with the new method so that it was not considered superior to the older one. However, if the precautions be taken to prevent occlusion of alkali which were described above, the results obtained are comparable to those with alkali blue.

As long ago as 1908 Cowie[2] cautioned against establishing too rigid a standard for moisture in resin of scammony because of the readiness with which such resins

[1] *Jour. Mysore Univ.*, 4 (1930), 241.

[2] *Pharm. J.*, 81 (1908), 365.

absorb moisture. This study shows that this criticism applies also to resin of ipomea. The moisture in the specimens examined varied from 0.65 to 5.25%. An upper limit of 4.0% would appear to be reasonable. The ester numbers ranged from 160.9 to 181.7. A range of from 160 to 185 would be reasonable. The ash ranged from 0.07% to 1.03%. Most of the specimens fell below 0.5% in ash. The upper limit of 0.5% as now required by the U. S. P. appears to be satisfactory. The acid numbers ranged from 8 to 18. A standard for acid number of from 8 to 20 is suggested. The saponification values ranged from 171 to 195. Limits of from 170 to 200 are suggested.

The U. S. P. X specifies that less than 5% of resin of ipomea shall be soluble in petroleum benzin. This test was applied to several of the specimens but, since no criticisms of this test had been received and each of the specimens tested complied with the requirements, not all of the specimens were subjected to the test. The tests for rosin, guaiac and other resins were carried out according to the U. S. P. The results were negative in each instance.

The U. S. P. X requires that from 80% to 90% resin of ipomea shall be soluble in ether. This test was applied to all of the specimens with one exception. Each of the three laboratory specimens complied with the requirements. About one-half of the others did not. It is noteworthy that some of the specimens which were prepared by manufacturers from drugs which they believed to be authentic fell below the U. S. P. X requirement. The portion of the resin which was insoluble in ether was dissolved in alcohol and the solution evaporated on lactose. Administration of these residues to cats indicated that they were physiologically inert.

Only one specimen exceeded 1% of alcohol-insoluble matter and only two contained over 0.5%. The laboratory specimens contained less than 0.1%. A limit of not to exceed 0.5% of alcohol-insoluble material would appear reasonable.

SUMMARY.

Fifteen specimens of resin of ipomea were examined. In most instances the moisture content exceeded the limit permitted by the U. S. P. X (1%). In a few cases the ash exceeded the U. S. P. X limit (0.5%). The acid number, saponification values and ester numbers were lower than are required by the U. S. P. X. In addition to the standards in the U. S. P. X, it is suggested that the alcohol-insoluble fraction and the water-soluble constituents should be determined. The iodine absorption number and the optical rotatory value are not of much value in differentiating between resin of ipomea and true resin of scammony.

ACKNOWLEDGMENTS.

The writer wishes to acknowledge his appreciation to the several pharmaceutical manufacturers who furnished the specimens of resin of ipomea for study and to the New York Station of the Food and Drug Administration for supplying the authenticated crude drugs from which the laboratory specimens were prepared. Thanks are also due to the Pharmacological Laboratory of the Administration for testing some of the fractions of resin of ipomea for physiological activity; also to W. R. Carter for carrying out a number of routine determinations and for checking many of the other analyses.

p-NITROBENZYL HALIDES AS REAGENTS FOR THE IDENTIFICATION OF PRIMARY AND SECONDARY AMINES.*

BY EDWARD LYONS.

The *p*-nitrobenzyl halides[1] have been found to be excellent reagents for the identification of a large number of acids, phenols and alcohols.[2] Lyons and Dox[3] have used the chloride for the preparation of a number of derivatives of the barbituric acid series. The reagent, *p*-nitrobenzyl chloride, has been found to be unsuitable for the identification of tertiary amines.[4] With primary and secondary amines, however, there is, usually, reaction with formation of colored crystalline derivatives of convenient solubilities and melting points. Alkyl amines have given pale yellow derivatives. In the aromatic series, monoamines have given deeper yellow substances, while the diamines have yielded brick-red derivatives.

PROCEDURE.

The procedure is essentially the same as that used for the identification of acids.[3] Working with known amines, the proportions used are based on the equation

$$RNH_2 + 2XCH_2C_6H_4NO_2 + Na_2CO_3 \longrightarrow RN(CH_2C_6H_4NO_2)_2$$

for primary amines, and

$$R_2NH + XCH_2C_6H_4NO_2 + {}^1/_2Na_2CO_3 \longrightarrow R_2NCH_2C_6H_4NO_2$$

for secondary amines.

With unknowns, based on the averages obtained from those amines which are recorded below, the proportions are roughly as follows:

For primary amines,	0.5 Gm. amine :	1.5 Gm. reagent :	0.4 Gm. Na_2CO_3
For secondary amines,	0.5 Gm. amine :	0.75 Gm. reagent :	0.2 Gm. Na_2CO_3
For diamines,	0.5 Gm. amine :	2.5 Gm. reagent :	0.8 Gm. Na_2CO_3

(Reagent = *p*-nitrobenzyl chloride.)

The amine and reagent are dissolved in a flask, in 10–20 cc. 95 per cent alcohol, and the carbonate dissolved in 5–10 cc. water is then added. Usually, a clear solution is obtained. Should some carbonate be precipitated it may be disregarded. The mixture is refluxed during one hour. If the derivative formed is insoluble it is filtered, washed with acidulated water, then with water, and in some cases with alcohol and ether. If no precipitation occurs, even on cooling, hot water is added to the reaction mixture till a turbidity persists. On cooling, the derivative usually precipitates. It is recrystallized from a suitable solvent. Usually two crystallizations are enough to give a constant melting substance. The yields are very good—50 per cent of theory, or better. No attempt was made to recover all fractions since high purity rather than quantity was desired. To avoid mixtures, when

* Contribution No 459 from the Research Laboratories of Parke, Davis and Company, Detroit, Michigan.

[1] In this work the bromide and chloride were used.

[2] Reid, *et al.*, *J. A. C. S.*, 39 (1917), 124, 304, 704, 1249, 1727.

[3] Lyons and Dox, *Ibid.*, 51 (1929), 288.

[4] Marvel, Scott and Amstutz, *Ibid.*, 51 (1929), 3638.

working with primary amines, the aim was to get a completely substituted amine. In Table I are given the derivatives prepared, with their several characterizations.

TABLE I.—*p*-NITROBENZYL DERIVATIVES OF.

Amine.	Composition, R = $-CH_2C_6H_4NO_2$.	M. p.* ° C.	Color.	Solubilities.
Methylamine[1]	$Me.NR_2$	102	light yellow	v. s. C_6H_6, Me_2CO, Et_2O, less in EtOH
Ethylamine[2]	$Et.NR_2$	67	light yellow	s. EtOH, pet. Et_2O
Ethyl-aminoacetate	$Et.CO_2.CH_2.NR_2$	108	light yellow	v. s. EtOH, Et_2O
Benzylamine	$C_6H_5CH_2.NR_2$	144	light yellow	s. EtOH, C_6H_6, insol. pet. Et_2O
Ethyl-*p*-aminobenzoate	$Et.CO_2C_6H_4NR_2$	117	canary yellow	s. EtOH, Et_2O, C_6H_6
Propyl-*p*-aminobenzoate	$Pr.CO_2C_6H_4NR_2$	114	canary yellow	v. s. EtOH, Et_2O, C_6H_6
p-Aminobenzene-sulphonic acid (sulphanilic acid)	$HSO_3C_6H_4-NR_2$	chars	canary yellow	s. s. organic solvents; sol. in alk.
Aniline[2a]	$C_6H_5.NR_2$	168	deeper yellow	s. s. EtOH, Et_2O; v. s. C_6H_6
Ethylaniline	$C_6H_5.NEt.R$	67	deeper yellow	v. s. EtOH, Et_2O, C_6H_6
Phenylaniline (Diphenylamine)	$(C_6H_5)_2.NR$	96	deeper yellow	s. EtOH, Et_2O, C_6H_6
p-Aminodimethylaniline	$Me_2NC_6H_4.NR_2$	210	brick red	v. s. C_6H_6, Me_2CO
o-Phenylenediamine	$R_2N.C_6H_4.NR_2$	198	brick red	s. EtOH, C_6H_6, AcOH
p-Phenylenediamine	$R_2N.C_6H_4.NR_2$	225	brick red	s. EtOH, less in C_6H_6 and Et_2O
Benzidine	$R_2N.C_6H_4-C_6H_4NR_2$	228	brick red	s. s. in organic solvents

* Uncorrected.

[1] Strakosch, *Ber.*, 6 (1873), 1062. Sealed tube reaction, m. p. 104° C.

[2] Paal and Spranger, *Ber.*, 30 (1897), 64. Sealed tube reaction.

[2a] As by-product in making the mono-*p*-nitrobenzyl derivative.[2]

SUMMARY.

p-Nitrobenzyl halides are useful reagents for the identification of primary and secondary amines. Alkyl amines yield light yellow derivatives, aromatic monoamines give deeper yellow bodies while the diamines yield brick-red derivatives. In general they possess definite melting points and differ in solubility from the mother substance thus adding to the ease of purification.

A TOXICOLOGICAL INVESTIGATION OF MERCURY AND LEAD.*

BY L. W. RISING AND E. V. LYNN.

Because of the numerous deaths attributable to mercury and lead and the subsequent seeking of chemical evidence, it would be well to have available certain experimental data which would indicate: The effect of preservatives or putrefaction on the recoverable amount of these substances, and how long after death an analyst might reasonably expect to find the full quantity of drug which was present in the body at the time of the demise. There is always the possibility of unsuspected organic combinations which might render an unknown quantity of either chemical proof against the present procedures for their isolation and determination.

In order to secure these quantitative data, a series of specimens consisting of lead or mercury in contact with organic material both with and without added preservatives was made up. The series was sufficiently large in number so that the poisons were exposed to nearly all of the conditions which they might encounter if the bodies containing them were embalmed, exposed to the natural action of putrefaction, or the organs removed for analysis and preserved with the usual tissue preservatives.

* Scientific Section, A. PH. A., Miami meeting, 1931.

The carriers for the poisons were stomachs from freshly killed sheep. These were minced and weighed amounts placed in 4-ounce wide-mouthed bottles. To each of these bottles there was added a known quantity of one poison; this was thoroughly incorporated with the tissue. A measured portion of preservative was next added and the bottle stoppered and sealed with paraffin. The samples which were to be permitted to decompose were treated in a like manner except that no preservative was added nor was one set stoppered. The latter were allowed free contact with air and changing weather conditions on the laboratory roof. The preservatives used were alcohol, a 10 per cent solution of formaldehyde, a 1 per cent solution of mercuric chloride, a saturated solution of arsenic trioxide, and embalmer's cavity fluid.

The formula for the cavity fluid is approximately as follows:

Absolute alcohol	(Volume)	35.00 per cent
Methyl alcohol	(Volume)	14.70 per cent
Glycerin	(Volume)	2.00 per cent
Ethereal constituents	(Volume)	4.00 per cent
Water and other constituents	(Volume)	44.30 per cent

Enough specimens were made up to permit three quantitative determinations of the drugs under every condition considered. These were made at approximately the ends of the first, third and seventh months of standing.

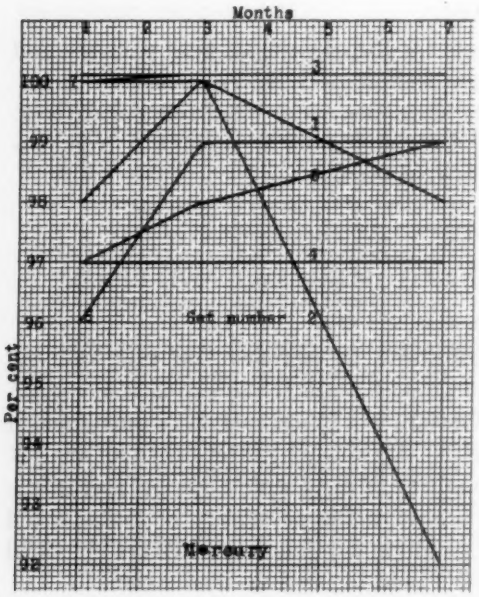


Fig. 1.—Mercury.

A number of processes have been devised for the extraction of mineral poisons in toxicological investigations, nearly all of which begin with the destruction of the contaminating organic material. To consumate this first step Treadwell and Hall (1) suggest the Carius method. Allen (2) makes use of Kjeldahl digestion. Wasterson (3) sulphuric and nitric acids, then potassium permanganate. For this work the destruction was brought about by means of the Fresenius-Babo procedure (4).

The search for simple yet accurate methods for the determination of these drugs led to an investigation of Waldbott's (5) modification of the Reinsch test as a quantitative procedure for mercury. In this method the mercury is precipitated from an acid solution on a copper foil which is then dried and weighed. The mercury is driven off by holding the foil over a flame until the grey film of the element has just disappeared, and the foil is weighed again. The difference in the two weighings represents the mercury originally present in the sample.

It is difficult to drive off the mercury without oxidizing some of the copper at the same time. The most serious objection, however, is the fact that the element

does not always plate out according to theory. A number of solutions were made up containing 0.2 Gm. of mercuric chloride. The mercury was deposited from these on copper according to the procedure of Reinsch. One group of samples stood an hour at room temperature. Another group stood an hour and a half, while two others were heated gently for a half hour and an hour, respectively. In a fifth group, the samples were boiled for 15 minutes. Table I contains the data for this series.

TABLE I.—INCREASE IN WEIGHT OF COPPER FOIL.

	Digested at 20° C.		Heated Gently.		Boiled.
	1 hour.	1½ hours.	½ hour.	1 hour.	15 minutes.
1.	0.0068	0.0098	0.0172	0.0226	0.0410
2.	0.0069	0.0121	0.0116	0.0168	0.0414
3.	0.0200	0.0221	0.0273	0.0290	0.0420
4.	0.0250	0.0170	0.0290	....	0.0425
5.	0.0005	0.0180	0.0368	0.0323	0.0339
6.	0.0200	0.0220	0.0324	0.0289	0.0337

It was thought that the lack of uniformity in the results might be due in part, at least, to variations in the size of the surface of the copper foil available for plating. Therefore, a new series of samples was set up from which the mercury was plated out on foils two and four inches square.

The results are shown in Table II:

TABLE II.—INCREASE IN WEIGHT OF THE COPPER FOIL.

	Two-Inch Foil.		Four-Inch Foil.	
	Boiled 15 min.	Boiled 20 min.	Boiled 15 min.	Boiled 20 min.
1.	0.0366	0.0288	0.0260	0.0310
2.	0.0310	0.0100	0.0300	0.0340
3.	0.0449	0.0040	0.0337	0.0350
4.	0.0338	0.0401	0.0389	0.0169
5.	0.0573	0.0310	0.0378	....
6.	0.0355	0.0171	....	....

As the differences in results still persisted, experiments were carried out using much smaller quantities of mercuric chloride. Table III contains the figures for this work. No better success was obtained with the reduced amount of chemical. It is obvious, therefore, that the modified Reinsch procedure is not a satisfactory quantitative method for mercury.

TABLE III.—DECREASE IN WEIGHT OF COPPER FOIL.

	Ten Mg. of Mercuric Chloride.		Twenty Mg. of Mercuric Chloride.	
	Boiled 15 min.	Boiled 30 min.	Boiled 15 min.	Boiled 30 min.
1.	0.007	0.0021	0.0002	0.0068
2.	0.005	0.0017	0.0039*	0.0081
3.	0.0060	0.0070	0.0009	0.0074
4.	0.0008	0.0009	0.0020	0.0020
5.	0.0008	0.0002	0.0009	0.0010
6.	0.0020	0.0039*	0.0017*	0.0090
7.	0.0007	....	....	0.0043

* Increase instead of loss in weight.

The assay method of the United States Pharmacopœia was employed in the quantitative work for mercuric chloride. The assay often gives high results, because of the inability to always completely free the mercuric sulphide precipitate of elementary sulphur. However, its simplicity recommends it.

TABLE IV.—RESULTS OF MERCURIC CHLORIDE ANALYSES.

Set Number.	1.	2.	3.	4.	5.	6.	7.
						Unpreserved.	
Preservative % found in.	Alcohol.	HCHO.	$HgCl_2$.	As_2O_3.	Cav. Fld.	Exposed.	Unexposed.
1.	100	98	101	97	97	96	100
2.	100	100	101	97	98	99	101
3.	98	92	101	97	99	99	..

1. Per cent recovered at the end of one month.
2. Per cent recovered at the end of three months.
3. Per cent recovered at the end of seven months.

Lead was determined as the sulphate. The liquid resulting from the digestion of the organs is treated with an excess of dilute sulphuric acid and concentrated over a free flame until dense white fumes are given off. Care must be exercised to avoid loss by spattering. The mixture with its char is diluted and filtered through a Gooch crucible. It is then dried, ignited and weighed.

TABLE V.—RESULTS OF THE LEAD ACETATE ANALYSES.

Set Number.	1.	2.	3.	4.	5.	6.	7.
						Unpreserved.	
Preservative % found in.	Alcohol.	HCHO.	$HgCl_2$.	As_2O_3.	Cav. Fld.	Exposed.	Unexposed.
1.	95	97	92	95	92	95	95
2.	95	94	90	95	93	94	95
3.	96	94	94	97	93	97	97

1. Per cent recovered at the end of one month.
2. Per cent recovered at the end of three months.
3. Per cent recovered at the end of seven months.

The data clearly indicates that both mercury and lead can be recovered in practically the full amount under the ordinary conditions encountered in a body after death. Putrefaction, or preservation with any of the common agents used for that purpose, in no way interferes seriously with their recovery. The toxicologist, by careful choice of procedure and the exercise of reasonable care in manipulation, should be able to recover 92–98 per cent of either poison. While this would normally be expected there is as yet little confirmatory evidence in the literature, and since the unexpected frequently occurs in medico-legal cases it was deemed advisable to demonstrate the point.

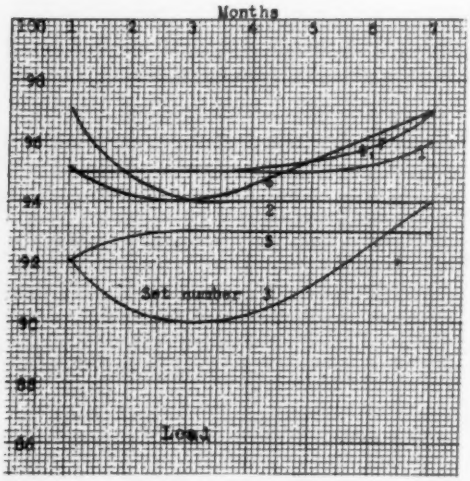


Fig. 2.—Lead.

SUMMARY.

1. The modified Reinsch method was examined with respect to its use as a quantitative procedure. It was found to be not satisfactory.

2. Practically the full quantity of mercury present in a body at the time of death can be recovered whether it has been preserved with alcohol, a 10% solution

of formaldehyde, a 1% solution of mercuric chloride, a saturated solution of arsenic trioxide, embalmed, unpreserved and exposed, or unpreserved and protected from the elements. Time is a negligible factor in the disappearance of the poison.

3. Lead is recovered to about the same extent as mercury when it is exposed to similar conditions.

REFERENCES.

(1) Treadwell and Hall, Analytical Chemistry, 1924.
(2) Allen, Commercial Analysis, 1923.
(3) Wasterson, *Sv. Farm. Tids.*, 21–54 (1917), 9.
(4) Peterson, Haines and Webster, Legal Medicine and Toxicology, 1923.
(5) Waldbott, *Sci.*, 1 (1919), 441; and Peterson, Haines and Webster, *Legal Medicine and Toxicology* (1923), 197.

VIII. THE STANDARDIZATION AND STABILIZATION OF ERGOT PREPARATIONS.*

BY EDWARD E. SWANSON, CLARENCE E. POWELL, ASA N. STEVENS AND E. H. STUART.

Since 1923, when Broom and Clark (1) first introduced the Isolated Rabbit Uterus Method, there has been some discussion as to which of the many methods give the more accurate results for the standardization of ergot preparations. To briefly summarize the literature, Burn (2), Linnell and Randle (3), Burn and Ellis (4), Nelson and Pattee (5), Pattee and Nelson (6), Thompson (7), and Swanson (8) apparently agree that the Epinephrine-Reversal Uterus Method (Broom and Clark) is equal to or more accurate than the U. S. P. Cock's Comb Method in determining the potency of ergot. Thompson (7) recommended that the Epinephrine-Reversal Method be adopted as the official method in the next Pharmacopœia in place of the now official U. S. P. Cock's Comb Method for the biological assay of ergot and its preparations.

It is the purpose of the writers to report in this article further (1) comparative study of the Epinephrine-Reversal and Cock's Comb Methods, and (2) the p_H or hydrogen-ion concentration in relation to deterioration and stabilization of ergot and its preparations.

EPINEPHRINE-REVERSAL METHOD.

Pattee and Nelson (6) state that much valuable time can be saved by external examination of the vaginal orifice in the selection of a uterus. Long and Evans (9) investigated the œstrus cycle of various animals and found that the rabbit is an exception in that the ovum is present only at the time of copulation. Knude and Proud (10) observed that there is no regularity in the appearance or disappearance of the different types of epithelial cells or leucocytes in the lumen of the vagina of normal rabbits. Our own experience showed that by vaginal smears studied under a microscope no definite œstrus cycle could be determined in rabbits.

The selection of a muscle with the Epinephrine-Reversal Method as previously reported requires some care and experience. The segregation of young female rabbits until they reach maturity (2.5 Kg. to 3 Kg.) is helpful in obtaining a suitable uterus. This also eliminates the influence of pregnancy, multiparous parturition and postpartum factors. The size of the individual uterus, regardless of the age of the rabbit, is variable. However, this is not so great

* Scientific Section, A. PH. A., Miami meeting, 1931.

when the rabbits are segregated. A uterus with strong active normal rhythmic contractions is usually too rapid in its contractions when stimulated with epinephrine and is not in our findings considered so reliable.

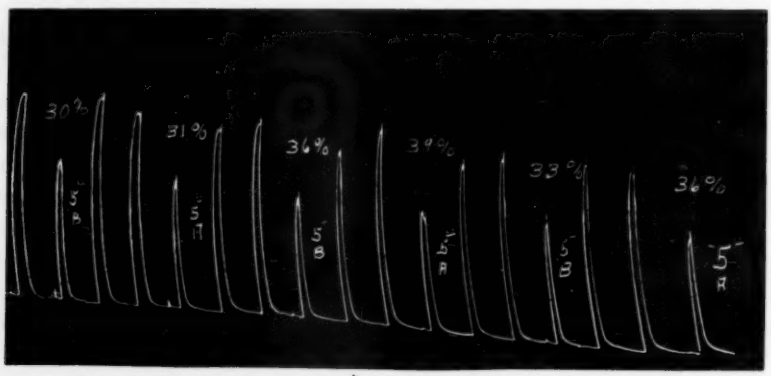
By the segregation of young rabbits allowed to reach maturity (2.5 Kg. to 3 Kg.) and careful external examination of the vaginal orifice, there is no difficulty in obtaining a suitable uterus.

TECHNIQUE OF ASSAYING BY THE EPINEPHRINE-REVERSAL METHOD.

Having selected a suitable uterus, the following three methods of technique have been studied. These methods have been previously reported in a preliminary way by one of us (Swanson (8)). They are here again discussed with added data and technical findings.

A. *Complete paralysis* of the uterus by ergot.
B. *Partial paralysis* of the uterus.
C. *The ratio of epinephrine stimulation to ergot paralysis.*

Method A.—A rabbit is killed and the uterus is excised. The excised uterus is divided into one-cm. pieces longitudinally in the plane of the mesenteric attachment. With virgin or



A = F.E. Ergot U.S.P. #2
B = F.E. Ergot U.S.P. #2, aerated 20 hours

Figure V

small rabbits, it is best to use whole segments of the uterus. Two pieces are mounted together in a bath of Ringer fluid.

The reaction consists in introducing epinephrine and observing the height of contraction; after washing out the epinephrine the ergot preparation is introduced and is left in for five minutes. The fluid is then changed and five minutes later epinephrine (same dose as above) is again introduced, and the effect observed. If epinephrine still produces a contraction the experiment is repeated with an increased concentration of the ergot. The approximate strength of the preparation can thus be determined fairly rapidly, and then the experiments are repeated on fresh uterine strips, the end-point desired being the concentration of the preparation which in a single dose almost completely abolishes the epinephrine response.

Method B.—Partial paralysis involves the use of small doses of ergot (both standard and unknown) that will only partially inhibit the epinephrine stimulation (20% to 50% inhibition). Gradually decreasing doses of epinephrine are injected, until quantitative contractions are obtained and then a small dose of ergot is injected, five minutes' duration allowed, washed at least twice, and five minutes later the same amount of epinephrine is injected as before ergot application. The amount of inhibition is measured, compared with the control and the reduction calculated. Injections of epinephrine are repeated until the contractions of the uterus return to constant

height with the same amount of epinephrine. The recovery of a uterus to constant height varies from 20 to 60 minutes. When the contractions are constant, ergot is again injected and the same technique repeated as above. Thus small doses of ergot or partial paralysis permits the injection

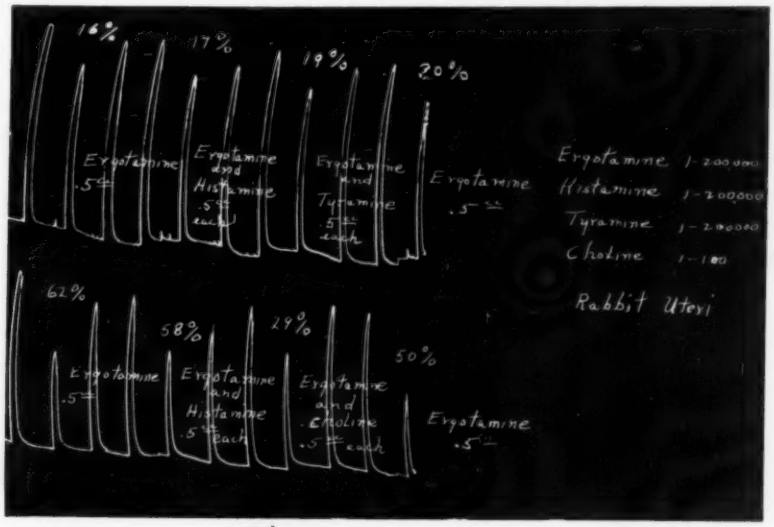


Figure I

of several doses of ergot on the same uterus. By alternating the unknown and standard on the same muscle one can obtain fairly accurate comparisons as shown in Figure V.

Method C.—This technique determines the amount of paralysis in terms of epinephrine, that is, following the ergot paralysis the amount of epinephrine injected is increased until contractions equal in height the contraction of epinephrine before ergot was injected. Thus the amount

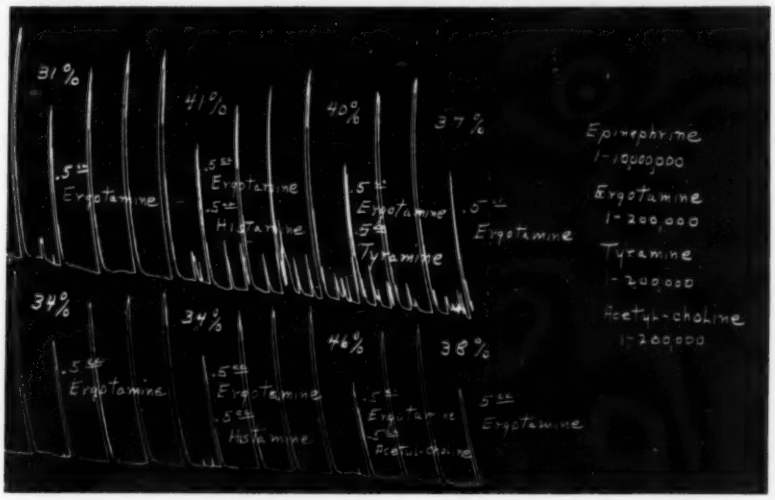


Figure II

of increase in epinephrine depends upon the amount of ergot injected or the degree of paralysis caused by ergot.

All of the above three methods will give accurate results. More than five hundred samples of ergot have been assayed by these three methods of technique.

The results show that *Method B is the more practical requiring less time and the inhibiting dose of ergot more easily controlled.*

THE EFFECT OF HISTAMINE, TYRAMINE AND CHOLINES ON ERGOT INHIBITION.

Pattee and Nelson (6) have shown that histamine alters considerably, if not repeatedly washed, the ergot inhibition by augmenting the epinephrine contrac-

Figure III

tions. This, however, was not observed if several washings were made after ergot application. Our own findings confirm this observation. We have extended this investigation with tyramine, choline and acetyl-choline which are, like histamine, known constituents in the ergot drug. As shown in Figures I, II and III, doses of ergotamine tartrate 1–40,000,000 produce distinct inhibition. Histamine, tyra-

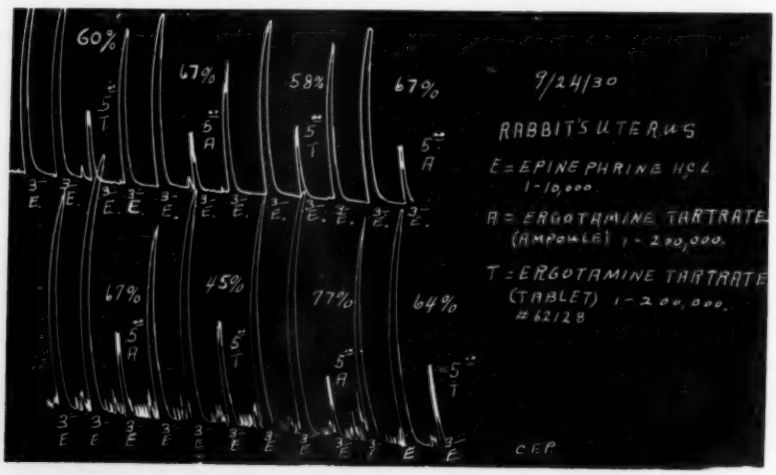


Figure IV

mine and acetyl-choline each with dilutions of 1–20,000,000 to 1–40,000,000, given alone or with ergotamine tartrate, allowed to act for five minutes, produce no inhibition or prevents the inhibiting effect of ergotamine. These figures are based on the assumption that the ergot drug contains the same or twice as much of each of the amines as that of the alkaloids. Thus an ergot drug containing 0.05% to 0.10% of

the amines apparently has no synergistic or antagonistic effect on the physiological assay of the ergot alkaloid.

COMPARATIVE DATA WITH ERGOT BY THE EPINEPHRINE-REVERSAL UTERI AND COCK'S COMB METHOD.

Broom and Clark (1), Burn (2), Burn and Ellis (4), Linell and Randle (3), Pattee and Nelson (5,6), Prybill and Maurer (11), Thompson (7), and Swanson (8), have already shown that the Epinephrine-Reversal and Cock's Comb Methods gave correlative results in determining the potency of ergot. Tables I and II show further confirmative data that the Epinephrine-Reversal Method is in close agreement with the Cock's Comb Method. In average figures the Epinephrine-Reversal Method gives slightly higher potency values for ergot than the Cock's Comb Method.

TABLE I.—COMPARATIVE CRUDE DRUG ERGOT ASSAY.

Error ± 10.

Crude Drug No.	Date of Assay.	Reversal Uteri Method, Per Cent.	Cock's Comb Method, Per Cent.
1	12- 3-29	100	100
2	4-16-30	100	100
3	6-16-30	100	100
4	6-23-30	100	80
5	6-23-30	100	90
6	6-24-30	75	60
7	6-30-30	100	100
8	6-30-30	100	100
9	6-30-30	100	100
10	10-24-30	100	120
11	10-24-30	100	100
12	11-14-30	100	100
13	11-18-30	50	−50
14	11-18-30	50	70
15	11-19-30	50	50 to 100
16	11-19-30	25	25 to 50
17	11-20-30	100	110
18	12-30-30	100	100
19	12-30-30	100	90
20	12-30-30	100	100
21	1-19-31	100	100
22	1-20-31	100	100
23	1-21-31	100	100
24	2- 2-31	100	140
25	2- 2-31	50	75+
26	2-20-31	75	100
27	3- 4-31	100	100
28	3- 4-31	100	100+
29	4-24-31	150	100+
30	4-24-31	100	100+
31	5-11-31	100	100
32	5-11-31	100	100+
33	6- 2-31	50	−50

It is our opinion as the result of over five hundred tests within the last three years, that either method of assay can be used to determine the alkaloidal content of ergot preparations. Either method cannot be used with accuracy without some

experience. We also find that by the careful segregation of young females allowed to reach maturity, and with experience in selecting a suitable uterus, the Epinephrine-Reversal Method is less costly and is more accurate in determining the alkaloidal content of ergot. Therefore, *it is recommended that the Epinephrine-Reversal Method be considered as a supplementary assay to the Cock's Comb Method in determining the potency of ergot preparations.*

TABLE II.—COMPARATIVE F. E. ERGOT U. S. P. ASSAY.

Error ± 10.

Date.	F. E. Ergot U. S. P., Sample No.	Cock's Comb Method, Per Cent Activity.	Reversal Uteri Method (Broom and Clark). Alkaloidal content calculated.	Per cent activity.
11–14–29	1	80	0.0500	90
11–15–29	2	90	0.0475	95
11–22–29	3	50	0.0325	65
11–26–29	4	110	0.0550	110
1–17–30	5	120	0.0650	130
2– 5–30	6	150	0.1000	200
2– 4–30	7	105	0.0500	100
7–22–30	8	100	0.0500	100
7–23–30	9	100	0.0500	100
8–22–30	10	100	0.0500	100
8–22–30	11	50	0.0333	$66^2/_3$
1–13–31	12	100	0.0500	100
1–20–31	13	90	0.0500	100
2–20–31	14	100	0.0550	110
3–25–31	15	100	0.0500	100
4–20–31	16	40	0.0250	50
4–20–31	17	60	0.0400	80
6– 2–31	18	40	0.0250	50
6–15–31	19	95	0.0500	100

A CHEMICAL AND BIOLOGICAL COMPARISON.

As shown in Table III a Fluidextract of Ergot was prepared by percolating with neutral 50% alcohol. The p_H of this fluidextract without acid was 5.77 and assayed 100% by the Epinephrine-Reversal and U. S. P. Cock's Comb Methods. This fluidextract was divided into twenty-two (22) parts. As shown in Table III various quantities of tartaric acid, hydrochloric acid and sulphuric acid were added to nineteen (19) of the twenty-two (22) samples. Samples Nos. 1, 8, 15 are the same and represent the original fluidextract with neutral alcohol menstruum. The hydrogen-ion concentration or p_H of these three samples was 5.77, 5.79 and 5.80, respectively. These p_H findings are considered reliable checks inasmuch as the p_H operator did not know that they were samples of the original fluidextract. Table III shows the hydrogen-ion concentration (p_H) of all the samples.

Three to six months later these samples were assayed by the Epinephrine-Reversal Method and Smith's (15) Chemical Method. The chemical method (Smith's colorimetric method) was used with the following modifications. Five cubic centimeters of the Fluidextract of Ergot were placed in a small separatory funnel and placed on a steam-bath in a current of air to evaporate the alcohol. After evaporation 50 cc. of distilled water and 2 cc. of ammonium hydroxide (1 + 1) were added to the separatory funnel. The mixture was shaken several times. This solution was then run into a Watkin's Extraction Apparatus and extracted with ether for four hours. The ether extract was then transferred to a separatory funnel and washed with two 25-cc. portions of

distilled water, which removed most of the yellow pigment present in the ether solution. Shake the ether solution with three separate (10 cc., 10 cc. and 5 cc.) portions of 1% tartaric acid. Evaporate the tartrate solution on a water-bath to remove ether and make up to 40 cc. Two cubic centimeters of this solution and one cubic centimeter of *p*-dimethyl-aminobenzaldehyde solution are mixed. The color is allowed to develop and compared with color solutions of the standard ergotamine tartrate.

As shown in Table III and Chart III, the chemical method gives correlative results with the Epinephrine-Reversal Method. As a whole the chemical results are slightly lower than the biological. The biological assays were made the third, fourth, fifth and sixth months. The chemical assays were carried out during the fifth and sixth months.

TABLE III.—A CHEMICAL AND BIOLOGICAL COMPARISON.

This table represents a Fluidextract of Ergot divided into 22 parts and various amounts of acids added. The original assay was 100% by the Cock's Comb and Reversal Uteri Methods.

Fluidextract of Ergot, Sample No.	Date Made.	Acid.	p_H.	Chemical Method (Smith). Date of assay.	Chemical Method (Smith). Activity.	Reversal Uteri Method (Broom and Clark). Date of assay.	Reversal Uteri Method (Broom and Clark). Activity.
1	1-3-30	None	5.77	6-23-31	40%	5-27-31	40%
2	1-3-30	Tartaric	5.28	.....	..	.....	..
3	1-3-30	Tartaric	5.13	6-25-31	20%	5-29-31	30%
4	1-3-30	Tartaric	4.87	6-25-31	40%	5-26-31	50%
5	1-3-30	Tartaric	4.67	6-23-31	50%	5-11-31	60%
6	1-3-30	Tartaric	4.26	6-23-31	50%	5-25-31	50%
7	1-3-30	Tartaric	3.89	6-23-31	90%	5-29-31	100%
8	1-3-30	None	5.79	6-23-31	40%	5-27-31	40%
9	1-3-30	HCl	4.71	.....	..	6- 8-31	30%
10	1-3-30	HCl	4.48	6-29-31	30%	6-12-31	37.5%
11	1-3-30	HCl	4.11	6-29-31	64%	6- 9-31	75%
12	1-3-30	HCl	3.55	6-29-31	80%	6-15-31	90%
13	1-3-30	HCl	3.04	6-30-31	92%	6-10-31	100%
14	1-3-30	HCl	2.58	6-30-31	74%	6- 9-31	85%
15	1-3-30	None	5.80	6-23-31	40%	4-26-31	40%
16	1-3-30	Sulphuric	4.72	6- 2-31	20%	4- 6-31	30%
17	1-3-30	Sulphuric	4.51	5-15-31	28.8%	3-29-31	35%
18	1-3-30	Sulphuric	4.10	5-15-31	40%	3- 6-31	50%
19	1-3-30	Sulphuric	3.45	5-15-31	40%	3-23-31	50%
20	1-3-30	Sulphuric	2.95	5-15-31	40%	3-22-31	50%
21	1-3-30	Sulphuric	2.60	5-15-31	24%	3-28-31	30%
22	1-3-30	Sulphuric	2.25	5-15-31	20%	3-30-31	30%

In regard to the hydrogen-ion concentration (p_H) of these samples, *the p_H appears to influence the stability of the alkaloids for at least six months, providing they are not exposed to air.* The samples close to a p_H of 3.00 show little deterioration with tartaric acid and hydrochloric acid. The samples with sulphuric acid show only 50% activity in three months at a p_H of around 3.00. We can give no explanation as to why the samples with sulphuric acid show less activity than with tartaric acid and hydrochloric acid. Further data is necessary on the Chemical Method which will be reported later.

THE EXTRACTION OF ERGOT DRUG BY NEUTRAL ALCOHOL AND ACID-ALCOHOL MENSTRUA.

Linnell and Randle (3) found that a series of fluidextracts, prepared with acid menstruum, contained considerably more of the alkaloid than when prepared with dilute neutral alcohol menstruum. These authors also observed that the presence

of alcohol as a solvent is essential, that a weaker alcohol solvent than 50% is unadvisable, and that a stronger solvent does not seem to be warranted.

Our findings agree with Linnell and Randle (3) in that an acid alcohol menstruum, particularly tartaric acid and hydrochloric acid, is more efficient than a neutral alcoholic menstruum in extracting the alkaloids of ergot. The extraction efficiency of this alcoholic acid menstruum, however, is dependent on the alcoholic percentage of the acid menstruum, as shown in the following table:

Crude Ergot Drug Number.	p_H of Crude Drug.	Alcohol Percentage.	Kind of Acid 1%.	Epinephrine-Reversal Broom & Clark %.	Chemical Method (Smith) %.
1	6.2	40	None	90	...
..	...	40	Hydrochloric	100	...
..	...	40	Tartaric	100	...
..	...	50	None	100	...
..	...	50	Hydrochloric	110	...
..	...	50	Tartaric	110	...
..	...	60	None	110	...
..	...	60	Hydrochloric	140	...
..	...	60	Tartaric	150	...
..	...	80	None	125	...
..	...	80	Hydrochloric	180	...
..	...	80	Tartaric	175	...
..	...	95	None	120	...
..	...	95	Hydrochloric	150	...
..	...	95	Tartaric	140	...
2	5.5	50	None	110	100
..	...	50	Hydrochloric	100	110
..	...	$66^2/_3$	None	108	95
..	...	$66^2/_3$	Hydrochloric	133	125
..	...	75	None	106	110
..	...	75	Hydrochloric	140	150
..	...	85	None	130	140
..	...	85	Hydrochloric	150	160

As shown in the above table, menstrua of neutral alcohol 40%, 50%, 60%, $66^2/_3$% and 75% appear to be of the same efficiency as solvents for the extraction of the alkaloids. Menstrua of 80%, 85% and 95% neutral alcohol are apparently better solvents than the lower percentages of alcohol. The presence of an acid (tartaric acid or hydrochloric acid) in 40% and 50% alcohol menstrua does not materially increase their solvent properties. The extraction value of these acid-alcohol solvents, is dependent on the alcoholic percentage of the acid menstruum. The extraction efficiency of a neutral alcoholic menstruum is influenced by the hydrogen-ion concentration (p_H) of the crude ergot drug, an ergot drug with a p_H of 5.5 being more easily extracted than an ergot drug with a p_H of 6.00 by a neutral alcoholic menstruum.

THE HYDROGEN-ION CONCENTRATION FACTOR.

In a previous study we reported that the hydrogen-ion concentration appears to have some influence in controlling the deterioration and stabilization of ergot preparations. Swanson (8) and Wokes and Elphick (12) have found that "percolation of ergot with neutral 50% alcohol menstruum, the extraction efficiency is greatly affected by the degree of acidity of the ergot drug, due to the phosphate and

other buffering substances which it contains. With the more acid ergots (p_H below 5.5) neutral alcohol menstruum may extract the ergot alkaloids almost completely as it is extracted by acidified (HCl or tartaric) alcohol. With less acid ergots (p_H above 6.0) neutral alcohol may extract less than half the amount of alkaloids than that taken out by acidified alcohol. If this p_H is to be maintained at the optimum point for extraction and stability, as suggested by some workers, it will be necessary to employ a fixed proportion of acid, but control will be necessary by means of p_H determinations." Wokes and Elphick (12) further found that the defatting of ergot increases the efficiency of extraction of both neutral and acidified alcohol. Wokes (13) and Wokes and Elphick (14) reported that liquid extracts of ergot and solutions of ergotoxine phosphate deteriorate rapidly, the deterioration being greater at room temperature and at incubation temperature. Thompson (7) showed that deterioration of the alkaloidal activity of Fluidextract of Ergot U. S. P. X was not as rapid as reported by Wokes (13) provided that the preparation is protected from excessive exposure to air. Previously one of us (Swanson (8)) reported on a Fluidextract of Ergot U. S. P. with various hydrogen-ion concentrations (see Table II and Chart I, JOUR. A. PH. A., 28 (1929), 1130–1131. This series was again assayed at the end of the third year. During the third year these samples were frequently exposed to air. The deterioration now shows a different curve from that reported previously. There is a distinct deterioration in the whole series; however, the samples with a p_H around 3.00 show the least deterioration (see Table IV and Chart I).

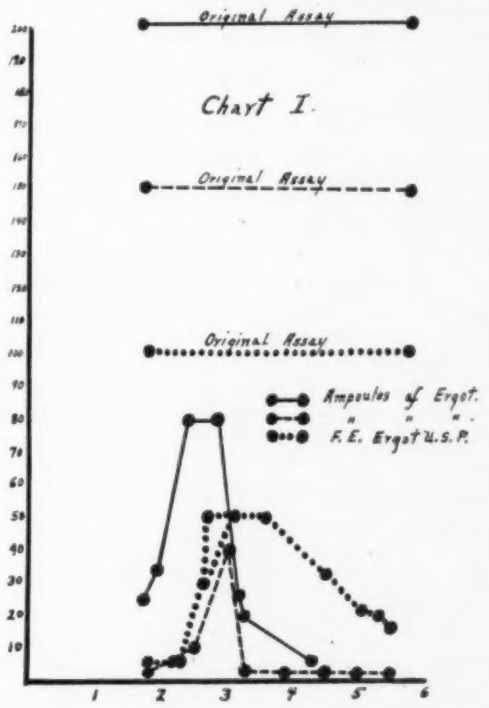


TABLE IV.—SAMPLE OF F. E. ERGOT WITH VARIOUS p_H RANGE ASSAYED AFTER THREEE YEARS' AGING.

F. E. Ergot Sample No.	p_H.	Cock's Comb Method (Per Cent Activity.)	Reversal Uteri Method (Broom and Clark). Alkaloidal content calculated.	Activity.
1	5.35	Less than 10%	0.0075%	15%
2	4.95	Less than 10%	0.010%	20%
3	4.51	Less than 10%	0.011%	22%
4	3.77	20%	0.015%	30%
5	3.21	30%	0.025%	50%
6	2.69	30%	0.025%	50%
7	2.26	Less than 20%	0.015%	30% ?
8	1.90	Less than 10%	−0.005%	−10%

Two preparations of solution of ergot for hypodermic use were prepared. As shown in Tables V and VI and Chart I there is a marked deterioration of all the samples. These two series were frequently exposed to air during the aging period. The samples around a p_H of 3.00 show the least deterioration. The original assays of the two preparations when made were 150% and 200%, respectively.

The effect of aeration has also been partially studied. Four samples of Fluidextract of Ergot U. S. P. made from four different lots of ergot were selected. A part of each sample (200 cc.) was placed in eight-ounce amber-colored bottles. Air was passed through by a glass tube reaching to the bottom of the bottle. These samples were aerated for 12 hours, 20 hours, 48 hours and 72 hours. The results are as follows:

Number of F. E. Ergot Sample.	Number of Hours Aerated.	p_H.	Epinephrine-Reversal Method. Before Aeration.	After Aeration.	Total Loss by Aeration.	Chemical Method. Before Aeration.	After Aeration.	Total Loss by Aeration.
1	12 hrs.	3.00	...	...	...	100%	100%	None
2	20 hrs.	2.70	100%	90%	10%	100%	87%	13%
3	48 hrs.	2.80	100%	80%	20%	120%	104%	16%
4	72 hrs.	2.96	110%	110%	None	100%	100%	None

As shown in the above table, the aeration of Fluidextract of Ergot with a p_H of 3.00 is apparently little affected in its potency. A fluidextract with a p_H of 2.70 and 2.80 show a 10% to 20% loss in activity when aerated for 20 hours to 48 hours.

All Fluidextracts of Ergot when exposed to excessivly high temperature, regardless of the p_H, deteriorate rapidly. Thus the hydrogen-ion concentration factor apparently has no influence in preventing the deterioration of the alkaloids of ergot when subjected to excessive heat or high temperature.

As shown in Chart II the hydrogen-ion concentration for some Fluidextracts of Ergot appears to have no influence in preventing deterioration. Fluidextract of Ergot No. 1, as shown in

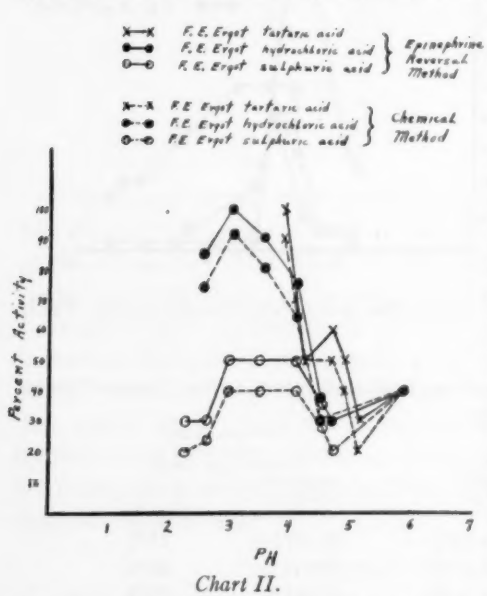


Chart II.

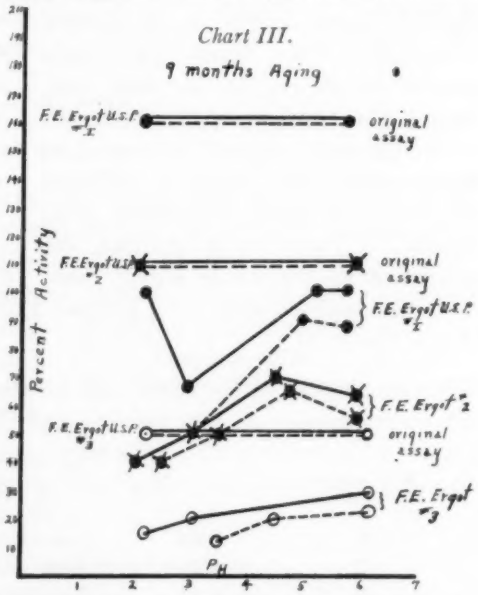


Chart II, originally assayed 160% by the Cock's Comb and Epinephrine-Reversal Methods. To various samples of this lot hydrochloric acid was added, thus varying the p_H from 4.70 to 2.20. These samples, after nine months' aging, were again assayed by the two biological methods. Fluidextracts of Ergot Nos. 2 and 3, as shown in Chart II, were made from two different lots of ergot drug. After nine months' aging the samples were again assayed.

All three of the fluidextracts show a distinct deterioration regardless of the hydrogen-ion concentration. The various hydrogen-ion concentrations apparently had no influence in preventing the deterioration.

TABLE V.—ORIGINAL ASSAY = 150% SOLUTION OF ERGOT FOR HYPODERMIC USE.

Sample No.	Date Made.	p_H.	Date Assayed.	Broom and Clark (Per Cent.)
1	3–11–29	5.50	3–10–30	1%
2	3–11–29	4.50	3–11–30	1.25%
3	3–11–29	3.90	3–12–30	1.66⅔%
4	3–11–29	3.30	3–14–30	2.5%
5	3–11–29	3.00	3–18–30	40.0%
6	3–11–29	2.50	3–21–30	10.0%
7	3–11–29	2.20	3–24–30	5.0%
8	3–11–29	1.80	3–30–30	2.0%

Considering the results as shown in Tables IV, V, VI and Charts I and II: (1) Not all Fluidextracts of Ergot are influenced by the hydrogen-ion concentration in preventing deterioration. (2) For some Fluidextracts of Ergot the hydrogen-ion concentration of around 3.00 appears

TABLE VI.—ORIGINAL ASSAY = 200% SOLUTION ERGOT FOR HYPODERMIC USE.

Sample No.	Date Made.	p_H.	Date Assayed.	Broom and Clark (Per Cent.)
1	1–16–29	4.30	9–15–29	5%
2	1–16–29	3.20	9–16–29	17%
3	1–16–29	2.90	9–20–29	80%
4	1–16–29	2.40	10– 7–29	80%
5	1–16–29	1.90	10– 9–29	33⅓%
6	1–16–29	1.75	10–11–29	25%

to be the critical point where there is the least deterioration. (3) The passing of a current of air through a fluidextract appears to be influenced by the hydrogen-ion concentration in preventing deterioration. (4) The hydrogen-ion concentration appears to have no influence on a fluidextract if frequently exposed to air or subjected to excess heat or temperature.

(*To be continued*)

TRANSPARENT LIFE STUDIES.*

2. EFFECT OF STRYCHNINE UPON DAPHNIA.[1]

BY ARNO VIEHOEVER AND ANNA SCHWENK MIKURIYA.

The remarkable suitability of certain transparent organisms as Daphnia, an ideal representative of transparent life (1), for purpose of demonstration of major life functions, namely, the action of the muscular, glandular and nervous system, has been pointed out before by one of us (2). Equally the use of this or other transparent animals for testing drugs was suggested. To demonstrate that the effect of stimulants and depressants and other therapeutic agencies can be quantitatively checked, many experiments were carried out, others are under way. The results obtained with a soluble salt of the alkaloid strychnine on Daphnia magna will be first recorded here.

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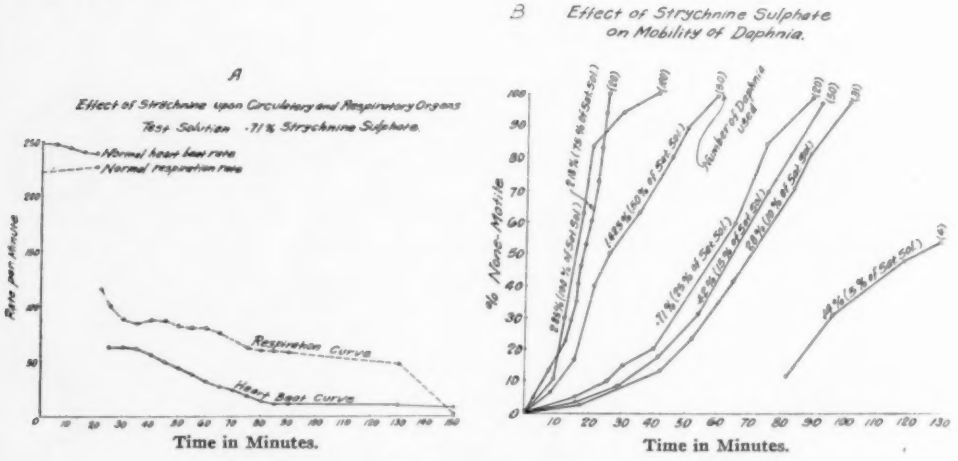
* From the Biochemical Research Laboratories of the Philadelphia College of Pharmacy and Science. The studies have had the initial support of the AMERICAN PHARMACEUTICAL ASSOCIATION and are continued with the generous help of Dr. Kilmer, New Brunswick, supporting the Kilmer Fellowship.

[1] Scientific Section, A. PH. A., Miami meeting, 1931.

General Physiological Effects.—The general effect of strychnine upon Daphnia is that of the well-known tonic or stimulating action of therapeutic small doses, the convulsive action of larger toxic, and the paralyzing action of fatal doses.

In a weak strychnine solution (containing 0.01% of strychnine sulphate) peristalsis is very marked and very rapid. The first noticeable effect upon the Daphnia placed in solutions weaker than 1% strychnine sulphate is the swimming of the animals in circles, due to paralysis of the left or the right large front swimming leg, used so prominently for locomotion. Normally the movements of the swimming antennæ or legs vary somewhat: For example, a rate of 88, 79, 71, 69 was observed, but the normal rate will be maintained within certain individual limits. However, when the Daphnias were placed in a 1% solution of strychnine sulphate, the rate of movement of the swimming legs increased to 228 per minute at the end of 15 minutes' contact in the poison, thus showing greatly increased, if not convulsive motion. Equally, intermittent body vibration was observed in this 1% solution. The following detail effects were noted in our records and may serve here for further illustration:

Animal: Daphnia. Environment: Culture water, containing 1% strychnine sulphate. Temperature 22° C.



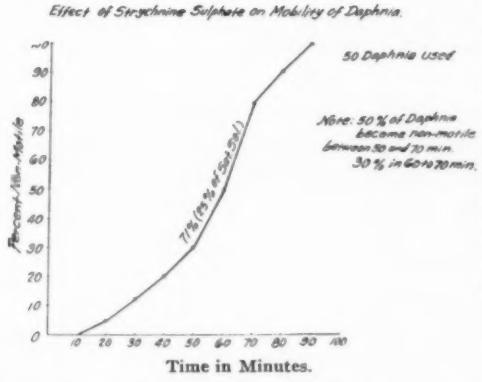
TIME OF CONTACT.

After 1 minute	The Daphnia swims on back, its whole body begins to vibrate rapidly.
After 10 minutes	Swimming on back, continued.
After 15 minutes	Summersaulting motion.
After 25 minutes	Swimming head down with occasional rise to surface.
After 30 minutes	Swimming entirely head down.
After 45 minutes	Daphnia weak, lies on one side, flaps antennæ legs on one side, cannot raise legs above head.
After 60 minutes	Rapid vibration of body discontinued, animal swims on back, movements are slow, laborious.
After 80 minutes	Heart beat is greatly reduced; 10 strong beats per minute, liver is shrunken at the ends.
	Swimmeret breathing organs move much slower than normally, now only 98 times per minute.
After 90 minutes	Daphnia immobile; the swimmeret breathing legs move at rate of 40 per minute, Heart beats 5 times per minute; eye lenses are enlarged.

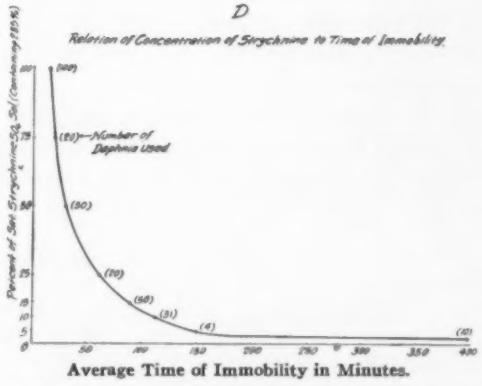
Effect of Strychnine upon Breathing Organs and the Heart.—The movement of foliaceous breathing organs or transformed swimmeret legs, absorbing the oxygen from the liquid environment, can be readily observed and the speed recorded. The rate, though intermittent, is usually less than the heart beat per minute. In a solution containing 0.712% of strychnine sulphate the heart beat is more effected than the rate of respiration. The results are recorded by Graph A.

Effect of Strychnine upon Body Mobility.—To observe the relative effect of strychnine solutions containing various amounts of strychnine sulphate, such liquids were prepared. A saturated (100%, so called) solution with 2.85%; a 75% saturated solution with 2.13%; a 50% saturated solution with 1.42%; a 25% saturated solution with 0.712%; a 15% saturated solution with 0.42%; a 10% saturated solution with 0.28%; a 5% saturated solution with 0.14% of strychnine sulphate. Usually Daphnias in large number were placed in these solutions of known strength and the experiments observed in special flat test-tubes, ending into a narrow bottom. Rather than using the time of death as a degree of toxicity, we determined the time when the Daphnias were no longer capable of body mo-

C


Effect of Strychnine Sulphate on Mobility of Daphnia.
50 Daphnia used
Note: 50% of Daphnia became non-motile between 50 and 70 min. 30% in 60 to 70 min.
71% (1% of Sol 5%)
Percent Non-Motile
Time in Minutes.

D



bility; that is, no longer able to swim up in the tube for oxygen or floating food supply, though certain body organs were still functioning, as the breathing and circulatory organs and, very weakly, the swimming legs. The animals usually were taken from the same strain, originally obtained from one female animal.

Graph B shows the results of these tests; the time when the Daphnias became non-motile was blotted against the number in % of animals that became non-motile.

Graph C shows a check experiment carried out with a 0.712% solution of strychnine sulphate, a day later than the experiments carried out with a solution of the same strength, 20 animals having been used in the first, 50 Daphnias in the second experiment. The graphs check remarkably well.

Graph D, shows, as did Graphs B and C, that immobility, a sign of toxic inability, is definitely dependent upon concentration of poison and time of action. The relation is expressed, however, not in a straight line, as, relatively, immobility is much quicker produced in more concentrated solutions of strychnine.

Of significance were the experiments carried out with 150 Daphnias from 5 different tanks. In a 1% strychnine solution the first case of immobility was ob-

served in 16 minutes; in the last case in 120 minutes; in 60 minutes, however, the majority of Daphnia lost their ability of body locomotion. An interesting biometric curve was obtained from these data.

CONCLUSIONS.

1. Transparent animals, and especially *Daphnia magna* are well suited for the qualitative and quantitative examination of general physiological effects upon the animal organism and its individual organs.

2. The general effect of strychnine upon Daphnia is that of the well-known tonic or stimulating action of small, therapeutic doses; the convulsive action of larger, toxic doses; the paralyzing action of fatal doses, one effect overlapping the other, depending upon particular organs or the difference in vitality of different organisms. Most striking were the effects upon organs of the muscular system; the liver, in agreement with observations recorded for more complex animals, also was visibly effected, through shrinking (3).

3. In a 0.712% solution of strychnine sulphate the heart beat was more effected than the rate of respiration.

4. The time when body immobility (the inability to rise from the bottom of flat test-tubes) is observed in the majority of animals may be used more conveniently—and much more speedily—than the time of death— as a judgment of degree of toxicity.

5. Immobility as well as death are definitely dependent upon concentration of poison in solution and time of action; results are relatively much quicker observed in concentrated than in dilute solutions of strychnine sulphate.

REFERENCES.

(1) "Transparent Life," by Arno Viehoever, *American Journal of Pharmacy*, 103 (1931), 252–278.

(2) "The Heart," by Arno Viehoever, *Ibid.*, 100 (1928), 718–745.

(3) "The Strychnine Group," by E. Poulsson; "Handbuch der experimentallen Pharmakologie," pages 322, 331, 392 (1920).

THE OIL FROM THE FRUIT OF MELIA AZEDARACH LINNÉ.*

BY LOYD E. HARRIS AND RALPH M. WILSON.

The oil[1] from the fruit is bitter. It is known as neem oil, Veepa oil, and Veppam fat. It has been used as an anthelmintic[2] and may be useful as a local application for treatment of rheumatism.

The constants[3] of the oil have been reported as follows: Specific gravity, 0.914, (15°); saponification value, 196.9; iodine value, 69.6; Reichert-Meissel value, 1.1; a butyro-refractometer reading of 52°.

EXPERIMENTAL.

A preliminary extraction with a series of selective solvents was made to determine something of the general composition of the fruit. The results are tabulated below: 80 Gm. of the ground air-dried fruit were used for each extraction.

* Scientific Section, A. PH. A., Miami meeting, 1931.

[1] U. S. Disp., 21st Edition, page 1215.

[2] Amer. Disp. (King), 8th Edition (1872), page 521.

[3] U. S. Disp., 21st Edition, page 1215.

TABLE I.

Solvent.	Sample A. Gm. extractive.	Sample B. Gm. extractive.	Average per cent.	Description.
Pet. ether	6.0225	5.7879	7.38	Light brown oil
Ether	1.8462	2.0115	2.41	Light brown, resin like
Abs. alc.	13.9224	12.7984	16.68	Dark brown powder
Water	3.7981	3.9932	4.87	Dark brown powder
Dil. alkali	3.8971	4.2131	5.07	Dark brown powder
Dil. acid	2.9317	3.1169	3.77	Med. brown powder
	32.4180	31.9210	40.18	

A larger quantity of the petroleum-ether extractive was desired for further investigation. Accordingly, eleven pounds of the ground fruit were extracted with this solvent. The petroleum was removed by distillation with reduced pressure. The constants of the oil thus obtained were determined as follows: Very bitter taste; bright yellow color; specific gravity 0.9218, at 25°; iodine value (Hanus), 73.1; saponification value, 188.3; acid value 3.5; unsaponifiable material, 1.1%.

SAPONIFICATION OF THE OIL.

Sixty-five Gm. of the oil were saponified with an alcoholic solution of sodium hydroxide, by refluxing for one hour. The alcohol was removed by evaporation; the soap was dissolved in water and extracted with ether (unsaponifiable matter); 50.5 Gm. of fatty acids were obtained when the soap solution was acidulated with diluted hydrochloric acid (1:1). (The presence of the glycerin in the aqueous portion was established by the acrolein test.)

THE FATTY ACIDS.

The separation of the solid acids from the liquid acids was next attempted using the Gusserow-Varrentrapp[1] method. By this method 19.5 Gm. of the liquid-unsaturated acids were obtained.

The bromine addition products[2] of the unsaturated were now prepared and separated.

The presence of linolenic acid was indicated by the melting point of the small amount of precipitate from the ether solution. A melting point of 182° was observed while the melting point of linolenic acid hexabromide[3] is 180–181°. The 4.5 Gm. of precipitate from the petroleum ether, upon recrystallization from alcohol, had a melting point of 111.5°. The melting point of linoleic acid tetrabromide, obtained at this point, is 113–114°.[4] A bromine determination by the Stepanow[5] method of this compound showed a bromine content of 53.8 per cent as compared to the calculated 53.33 per cent.

The residue obtained upon the evaporation of the petroleum ether-soluble bromination was a thick paste. A bromine determination, as above, showed it to contain 34.99 per cent as compared to a calculated 36.18 per cent for oleic acid dibromide.

The ether-insoluble lead soap was decomposed with diluted hydrochloric acid. The solid fatty acids floated on the aqueous solution, thus being readily

[1] Lewkowitsch, "Tech. Oils, Fats and Waxes," 6th Edition (1921), page 581.

[2] *Ibid.*, page 580; [3,4] *Ibid.*

[5] Kamm, "Qual. Org. Anal.," page 168.

removed. By fractional crystallization from alcohol, four portions were obtained. The melting point of each fraction was determined as follows: No. 1, m. p. 51–52°; No. 2, m. p. 50°; No. 3, m. p. 49°; No. 4, m. p. 50°. The melting point of myristic acid[1] is 53.8°, that of lauric acid[2] is 43.6° and that of palmitic acid[3] is 62.62°. Nothing definite can be stated about the identification of the above solid acids. Myristic acid would be indicated with probably lauric or palmitic acid.

An abstract from a part of the thesis submitted by Ralph M. Wilson to the Graduate faculty of the University of Oklahoma for the degree of Master of Science in Pharmacy, August 1930.

SUGGESTED ASSAYS FOR SOME N. F. PREPARATIONS.*

5. PHENOLATED WATER.

BY J. C. BAUER.

Phenolated Water, N. F. V is wholly dependent upon the phenol which it contains for its therapeutic efficacy; and, as the required phenol content is low (approximately 2 Gm. of phenol to 100 cc. of finished product), it is essential that the full amount be present. The following assay for phenol is, therefore, recommended. It is essentially the method of the United States Pharmacopœia, X, for Phenol *per se* and for Liquified Phenol.

Reagents.—1. 0.1 *N* Bromine solution (Koppeschaar's Solution, U. S. P. X)
2. 0.1 *N* Sodium thiosulphate solution, U. S. P. X
3. Hydrochloric acid, U. S. P. X
4. 20% Potassium iodide solution
5. Chloroform
6. Starch test solution, U. S. P. X.

Procedure.—Dilute 10 cc. of Phenolated Water to 100 cc. Introduce into a 250-cc. glass-stoppered Ehrlenmeyer flask 10 cc. of the diluted sample containing about 0.0206 Gm. of phenol. Add to the contents of the flask and likewise to the contents of a control flask prepared in the same way but containing none of the sample, 25 cc. of 0.1 *N* bromine. Quickly introduce into each flask 5 cc. of hydrochloric acid, insert the stopper and shake during half an hour. Add to each flask as quickly as possible, 5 cc. of potassium iodide solution (20%) and immediately replace the stoppers to prevent the escape of any bromine vapor. Shake well and add to each flask 1 cc. of chloroform to dissolve the precipitated tribromophenol. Titrate the liberated iodine with 0.1 *N* sodium thiosulphate, using starch T.S. as the indicator. The 0.1 *N* bromine remaining in the flask containing the sample subtracted from that remaining in the control flask represents the bromine consumed in the formation of tribromphenol. Each cc. of 0.1 *N* bromine consumed corresponds to 0.001568 Gm. of C_6H_5OH.

Suggested Standard.—Phenolated water contains in each 100 cc., not less than 2 Gm. and not more than 2.2 Gm. of C_6H_5OH.

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[1] Lewkowitsch, 6th Edition, page 158.

[2] *Ibid.*, page 160. [3] *Ibid.*, page 162.

* From the laboratory of A. G. DuMez, Professor of Pharmacy, School of Pharmacy University of Maryland.

DISCUSSION.

Two samples of Phenolated Water were carefully prepared from an assayed sample of Liquified Phenol, U. S. P. X. In the assay of the sample, 10-cc. portions of a solution containing 3.768 Gm. of Liquefied Phenol in 1000 cc. were used and gave the following results:

TABLE I.—ASSAY LIQUEFIED PHENOL.

Cc. of Sample.	Cc. 0.1 *N* Br_2 Taken.	Cc. 0.1 *N* $Na_2S_2O_3$ Required.	Cc. 0.1 *N* Br_2 Consumed.	Gm. C_6H_5OH Found in 1000 cc. of Solution.
10	38.54	17.14	21.40	3.36−
10	38.54	17.09	21.45	3.36+
10	38.59	17.14	21.45	3.36+
10	38.60	17.14	21.46	3.36+
10	38.60	17.14	21.46	3.36+
10	38.60	17.14	21.46	3.36+
			Average =	3.36

Using the above figure, the percentage of phenol (C_6H_5OH) was calculated to be 89.17%, *viz:* $\frac{3.36 \times 100}{3.768} = 89.17\%$ C_6H_5OH.

Sample No. 1 of Phenolated Water was prepared by diluting 22 cc. of the Liquefied Phenol to 1000 cc. The sample was analyzed and the following results were obtained:

TABLE II.—ASSAY PHENOLATED WATER.

Cc. of Diluted Sample.	Cc. 0.1 *N* Br in Control.	Cc. 0.1 *N* Br_2 in Unknown.	Cc. 0.1 *N* Br Consumed.	Gm. of C_6H_5OH Found per 100 Cc. of Aqua Phenolata.	Gm. of C_6H_5OH Calc. per 100 Cc. of Aqua Phenolata.
10	38.74	25.66	13.08	2.05+	2.09
10	38.74	25.56	13.18	2.07−	2.09
10	39.04	25.76	13.28	2.08+	2.09
10	39.04	25.76	13.28	2.08+	2.09
			Average =	2.07	2.09

Error based on calculated amount = 0.02

Percentage error = $\frac{0.02 \times 100}{2.09}$ or 0.95%

Sample No. 2 of Phenolated Water was prepared by diluting 22 cc. of the Liquefied Phenol to 1020 cc. In the assay of this sample, the following results were obtained:

TABLE III.—ASSAY PHENOLATED WATER, NO. 2.

Cc. of Diluted Sample.	Cc. 0.1 *N* Br_2 in Control.	Cc. 0.1 *N* Br_2 in Unknown.	Cc. 0.1 *N* Br_2 Consumed.	Gm. of C_6H_5OH Found per 100 Cc. of Aqua Phenolata.	Gm. of C_6H_5OH Calc. per 100 Cc. of Aqua Phenolata.
10	39.04	26.06	12.98	2.04	2.05
10	39.04	25.96	13.08	2.05+	2.05
10	32.35	19.35	13.00	2.04	2.05
10	32.35	19.35	13.00	2.04	2.05
			Average =	2.04	2.05

Error based on calculated amount = 0.01

Percentage error = $\frac{0.01 \times 100}{2.05}$ or 0.49%

THE ALKALOIDS OF ARGEMONE ÁLBA LESTIB.*

BY P. A. FOOTE.

The plants of the Papaveraceæ will no doubt interest the pharmacist for many generations to come. According to Small[1] two species of the genus Argemone in the Poppy family grow in Florida: they are Argemone álba and Argemone Mexicana. The latter species was investigated by Schlotterbeck[2] who found berberine and protopine.

Fig. 1.—*Argemone álba* Lestib.

Argemone álba, White Prickly Poppy,[3] grows in waste places in dry or sandy soil from Missouri to Florida and Texas.[1] It blooms in the spring and summer, presenting a beautiful white corolla.

A preliminary investigation showed that the dried overground portion of the flowering plant, collected in April, contained approximately 2.63 p. c. of alkaloids, determined gravimetrically. The stems contained 3.25 p. c. of alkaloids. It therefore seemed most worthy of further study.

The collection, drying, comminution, extraction and analysis were used to demonstrate these important processes to the writer's classes; hence, the different methods of isolation as given below. Frequently, the students, assisted as they were, continually kept in touch with the work, which was carried on at intervals over a period of two years. This practical demonstration proved of such value that the writer hopes to continue the practice, especially since Florida abounds in plants of pharmaceutical interest.

EXPERIMENTAL.

Collection and Preparation.—The material was collected during the third week of April 1929. It was found largely along the railroad tracks in the outskirts of Gainesville. Most of the plants were in bloom but still had unripe capsules. They were pulled up to get the roots so that the entire plant might be investigated. The roots were chopped from the overground portion for separate investigation. After air drying the drug was comminuted to No. 60 mesh.

INVESTIGATION OF THE ROOTS.

Eight hundred and forty-five Gm. of the ground dried root were moistened

* Scientific Section, A. PH. A., Miami meeting, 1931.

[1] "Flora of the Southeastern United States," 2nd ed., N. Y., 1913, page 462.

[2] *Pharm. Rev.*, 19 (1901), 458.

[3] Britton and Brown, "Illustrated Flora of the United States and Canada," 1st Edition, Phila. (1901), page 575.

with dilute ammonia water for the purpose of liberating the alkaloids from their combinations with acids.

The powder was dried at room temperature by spreading out in thin layers in a room having a good circulation of air. The drug was extracted with warm chloroform in a modified Soxhlet apparatus. The percolate was a deep orange color. Most of the solvent was distilled off. The last portion was allowed to evaporate spontaneously. It left behind a reddish brown residue. A 14X hand lens showed tiny needles grouped in many balls. The residue gave positive powerful tests for berberine including the chlorine water and nitric acid tests. The hydrochloride, hydriodide and chromate were prepared. All of these substantiated the evidence that the major alkaloid in the root was berberine. By the microscope no other crystals were apparent. Nevertheless, the chloroform extract was repeatedly extracted with warm water to separate the berberine from any other alkaloids that might be present, for berberine is soluble in water and most alkaloids are not. When this aqueous extract was evaporated to dryness, it was found to consist only of berberine. The remaining chloroform extract appeared resinous in nature. It was mixed with sand and extracted with dilute acetic acid. No more alkaloids were found.

INVESTIGATION OF THE OVERGROUND PORTION.

Four thousand five hundred and seventy-five Gm. of the ground dried overground portion were moistened with dilute ammonia and dried at room temperature. Part of it was extracted with chloroform and the remainder by 95 p. c. alcohol.

Chloroform Extraction.—3135 Gm. of the drug were extracted by warm chloroform in a continuous extraction apparatus. The extract was concentrated to a small volume and shaken out with dilute hydrochloric acid until all the alkaloids were extracted. The acid solution was concentrated to half its volume. On cooling berberine hydrochloride crystallized out in golden-yellow needles. The melting point was indefinite, turning black to dark brown above 110° C., undergoing decomposition. The following tests were positive for berberine: chlorine water, sulphonic acid, Froehde's reagent and the quinone test.

The filtrate was divided into four equal portions, namely, A, B, C and D. These were treated as follows:

A. This portion was precipitated by Sonnenschein's reagent, filtered, dried at low temperature and mixed with an equal volume of moist Na_2CO_3. It was then exhaustively extracted with chloroform and then with ether. When allowed to evaporate spontaneously the chloroform left a deposit of berberine and the ether nothing.

B. This portion was precipitated by Mayer's reagent, collected on a filter, and then suspended in distilled water. Hydrogen sulphide was then passed in until the solution was saturated and allowed to stand for forty-eight hours. The insoluble mercuric sulphide was filtered off and the filtrate evaporated to dryness in vacuum. An ether extract of the residue gave no alkaloid. This was followed by chloroform and acetone extractions which gave only berberine.

C. Precipitation of this portion was obtained by placing sticks of caustic soda in the solution until it became alkaline. They were removed. A dark brown precipitate settled out. It was collected on a filter paper and washed with water until neutral to litmus. After drying, successive extractions with ether, chloroform

and water gave only berberine in the chloroform and aqueous extracts. The ether extract yielded nothing.

D. A solution of picric acid (Hager's reagent) was added to the last portion. It was concentrated and added to twice its volume of acetone. In thirty minutes there crystallized a substance in irregular white plates, m. p. 232–235° C. This picrate was soluble in water but insoluble in chloroform and acetone. It was precipitated from its aqueous solution by ammonium hydroxide. Alkaloidal reagents, such as Wagner's, Sonnenschein's or Froehde's failed to precipitate it. Further investigation was impossible due to the small quantity isolated.

Alcohol Extraction.—1440 Gm. of the drug were extracted by warm 95 p. c. alcohol in a Sando extractor.[1] The alcohol was distilled off and the residue extracted with ether. The ether solution was shaken out with dilute acid and that made alkaline and shaken out with ether. The only base found was berberine. The alcoholic extract contained some crystals of potassium nitrate.

The writer wishes to acknowledge the excellent assistance of the following students: Louis Magid, W. S. Cate and S. M. Thronson. He wishes to thank Prof. H. W. Werner of the Department of Pharmacognosy for the photograph.

SUMMARY.

The dry overground portion of *Argemone álba* Lestib. contains 2.64 p. c. of alkaloids. This is practically all berberine.

A minute quantity of an alkaloid was isolated, the picrate of which melted at 232–235° C.

Berberine was the only alkaloid found in the root.

COLLEGE OF PHARMACY,
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ERGOT IMPORTS FROM RUSSIA AND SPAIN LARGER IN 1931.

Imports of ergot for consumption in the United States during 1931 amounted to 287,000 pounds as compared with 291,300 pounds in 1930 and 228,000 pounds in 1929. Assuming that supplies from Germany represent transshipments of Russian ergot, purchases thereof totaled 210,300 pounds in 1931 as against 121,000 in 1930. Imports from Soviet Russia direct totaled 8700 pounds in 1930 and 106,100 in 1931. Arrivals from Spain amounted to 70,200 pounds in 1931, as compared with 61,300 in the preceding year. Small quantities were recorded from Portugal and Belgium.

NUX VOMICA FROM FRENCH INDO-CHINA.

Nux vomica exported from French Indo-China finds a leading consuming outlet in the United States, the above country having surpassed India in the quantity shipped to the United States last year. Imports of nux vomica into the United States totaled approximately 1,924,600 pounds valued at $58,500 in 1931, as compared with 2,197,500 pounds worth $56,400 during 1930. French Indo-China in 1931 supplied 1,264,400 pounds while 617,800 pounds came from India. Small quantities were recorded as entering from Syria and Canada, presumably transshipments.

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[1] *Ind. Eng. Chem.*, 16 (1924), 1125

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Agar-agar	1.0
Glycerin	10.0
Tragacanth	5.0
Lysol	0.5
Water	100.0

Oersted—discovering the magnetic effect of the electric current. From a tablet in the Museum of Science and Industry at Chicago. This tablet and a duplicate in Copenhagen were erected to commemorate the hundredth anniversary of Oersted's achievement.—*Science News Letter.*

Hans Christian Oersted and his brother were memorialized by Hans Christian Anderson—"The two sons of a Danish Apothecary."—See Jour. A. Ph. A., 20 (1931), 368.

PHYTOCHEMICAL TERMINOLOGY.*[1]

BY EDWARD KREMERS AND COLABORERS.

The lumber chamber of phytochemistry is replete with terms the significance of which is not fully understood. Such common words as plant acids and alkaloids have given rise to much misunderstanding. It is easy enough to give a definition that represents a certain viewpoint during a given period of phytochemical development. It is rarely that we find in the literature even a brief account of the origin and changed usage of expressions employed, frequently with but little reflection, by most students of science.

Certain terms reflect the name of the plant from which the substance was first isolated or prepared. Thus thymol, which has been found in numerous plants, is named after thyme, but does not reveal either its physical or chemical nature any more than its wide distribution in the vegetable kingdom. Others, though representing identical substances, have been named after a variety of plant sources. Thus the hydrocarbon now known as limonene was formerly designated by twenty different plant sources, such as citrene, carvene, etc.

While many of these substances have found their places in the drawing room of structural chemistry, they are still known by their former names. Thus, for the sake of convenience, we use the simple word limonene rather than the structural designation $\Delta^{1(8,9)}$ Terpadiene; or the word citronellal rather than Dimethyl-2,6-octadiene-2,6- al-8. Numerous other words, however, have not been interpreted by structural designations, as *e. g.*, podophyllic acid, podophyllotoxin, etc.

In presenting this glossary of phytochemical terms, generic as well as specific, no attempt is going to be made to follow any order, not even an alphabetical order for the present, but to offer such material as happens to be available. The writer will be grateful to all who discover errors, or omissions, or misinterpretations if they will kindly bring them to his attention.

* * *

Paraffin. From Lat. *parum*, little, and *affinis*, affinity.[2] A name applied in 1830 by

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* Section on Historical Pharmacy, A. PH. A., Miami meeting, 1931.

[1] An account of the development of phytochemical terminology would, no doubt, afford interesting reading. Those who are interested in this subject may read to advantage Runge's attempt, made in 1820, and based on the dualistic chemistry of oxygen of that period. (*Neueste Phytochemische Entdeckungen zur Begruendung einer wissenschaftlichen Phytochemie: Critische Bemerkungen ueber die jetzt herschende Namenmacherey in der Phytochemie*, Chap. 4.) It reveals in striking manner the danger of forcing the growth of a language, even if the underlying principles are thought to be highly scientific. Should the present study develop far enough, the writer may, at some future date, attempt an account of this sort.

[2] The discovery of paraffin was announced in 1830 (*Schweizer-Seidel's Journal fuer Chemie und Physik*, 59, page 436) in an article bearing the title "Beitraege zur naeheren Kenntniss der trockenen Destillation organischer Koerper." (The editor refers to Dr. Reichenbach, in Blansko, Moravia, as the manager of a series of mines, iron furnaces, chemical and other factories in the territory of Count Salm.) From the heavy tar oil of the red beach he obtained upon fractional distillation, an oil from which crystals separated upon cooling. Neither filtration nor strong alcohol effected a separation, but dilute alcohol did. Recrystallized from hot, dilute alcohol they were colorless, odorless and tasteless; sp. gr. 0.8701; they did not react with red oxide of lead, manganese dioxide, sulphur, phosphorus, nitric acid, sulphuric acid, potassium hydroxide, potassium, and a number of other reagents. Hence he suggested the name paraffin (page 455).

Reichenbach[1] to a substance found in wood tar. Because it was not attacked by concentrated nitric acid, or other powerful chemical agents, he named it paraffin in order to designate "its most striking property, its few and weak affinities."[2] Reichenbach apparently supposed this substance to be a definite compound (Comp. Watt). Liebig,[3] in 1843, quotes two formulas, *viz.* C_1H_2 (Gay-Lussac) and $C_{20}H_{42}$ (Lewy). Writing about Chinese wax, Brodie in 1848 refers to the confusion that had already crept into the usage of this term.[4] Since the lower members of the series to which the hydrocarbons of this "paraffin" belong behave in the same way, Henry Watt[5] proposed to call the whole series the paraffins, better known as the methane series.

With the discovery of other substances like the original paraffin, but different in degree of saturation, the use of the term was extended to include unsaturated chain hydrocarbons[6] as well as cyclic hydrocarbons.[7]

In plant chemistry the term paraffin is applied to either chemical units or to mixtures consisting of solid members of the methane or related series.[8] Sometimes the word paraffin is compounded with the plant name, its source, as, *e. g.*, Aurade-paraffin.[9] Wherever the chemical identity is known, or supposed to be known, the specific names are preferably used.[10]

Whether a phytoparaffin belongs to the methane or ethene series is revealed by its capacity to decolorize bromine. Members of the several polymethylene series do not seem to have been found in plants thus far. For isolation of the paraffin and the identification of the individual hydrocarbons, also for their origin in plants, see hydrocarbons of the methane series, also hydrocarbons of the ethene series.[11]

He refers to it as a stearoptene (page 457) and calls attention to its possible technical application (candles, lubricant, acid-proof coating, etc.). He reports having obtained it likewise from the white pine and supposes that it may be obtained by the destructive distillation of all woods (page 459).

No elementary analysis is recorded.

According to *Penny Cycl.* XII, 396 of 1838 the substance under consideration was discovered almost simultaneously by Dr. Christison in England and by Reichenbach in Moravia. However, the former named his product petrolin (*Murray's Engl. Dict.* 1).

[1] "Sollte sich auf diese Weise meine Meinung, dass der hier abgehandelte Koerpere in bis jetzt unbekannter, fuer die Wissenschaft neuer sey, bewaehren: so wuerde ich mir eriauben, fuer ihn die Benennung *Paraffin* vorzuschlagen, das Auffallendeste in seinem Verhalten, seine wenigen und schwachen Verwandtschaften, bezeichnend, und abgeleitet von den Worten *parum* und *affinis*, welche sich, den Gesetzen der lateinischen Versification zufolge, die vor einem Vocale die Elision der Sylbe *um* erheischt, sprachrichtig zu dem Worte *Paraffinin* zusammen siehen lassen, und durch Abkuerzung *Paraffin* geben, wobei der Accent auf das zweite a faellt." (*Journal fuer Chemie und Physik*, 59 (1830), 455.)

[2] Quotation from Schorlemmer, *Rise and Development of Organic Chemistry*, page 93.

[3] *Handb. d. Chemie*, page 1287.

[4] Ceroten "....besteht....aus einem festen Kohlenwasserstoffe, eine von jenen Substanzen, die unter dem allgemeinen Namen Paraffin umfasst und verwechselt worden sind." *Annalen*, 67, page 210.

[5] "This substance is a hydrocarbon or a mixture of hydrocarbons of the series C_nH_{2n+2}... the name paraffin may therefore be conveniently used as a generic term for the whole series." (Watt's, *Dict. Chem.*, VI, page 705.) (Comp. also Schlorlemmer's, *Rise and Development of Org. Chem.* (1894), page 92. See also *Murray's New Engl. Dict.* Paraffin. 3.)

[6] "Das Stearopten des Rosenoels gehoert, wie Flueckiger dargetan hat, zu den Kohlenwasserstoffen der Paraffinreihe C_nH_{2n}." (Gildemeister, *Die aeth. Oele*, 2te Aufl., Bd. 2, page 591.)

[7] "Cyclo Paraffins or Polymethylenes." (C. O. Johns, *History of Chem. of Petrol. Research*, page 7; also *Bulletin Am. Petrol. Institute*, June 30, 1926, page 7.)

[8] "The paraffins thus far isolated...." (Gildemeister-Kremers, "The Volatile Oils," 2nd Edition, Vol. I, page 278.)

[9] "Aurade-paraffin od. Neroli camphor," Gild., *Die aeth. Oele*, 2te Aufl., Bd. III, page 101.

[10] *E. g.*, Triacontane, etc.

[11] An enumeration of these will be found in Gildemeister, *Die aeth. Oele*, 3te Aufl., Bd. I, page 302.

In chemical and pharmaceutical technology, hence in commerce, the word paraffin has been used to designate a number of petroleum products. Originally employed as a name for a solid, it has been used for liquids and semi-solids as well. Thus, *e. g.*, in England the word is used to designate benzin, etc., the "gas" of our automotive language.[1] The pharmaceutical usage of the terms liquid paraffin[2] (*Paraffinum liquidum*),[3] soft paraffin[4] (*P. molle*),[5] and solid or hard paraffin[6] (*P. durum*)[7] is well known. The same designations are employed irrespective of whether the hydrocarbons involved are members of the methane series, of the olefene series, or of the several polymethylene series, or whether they are mixtures of two or more series. In order to differentiate its use from that employed for technological or motive purposes it is named "Medicinal Paraffin."[8] Its therapeutic action is indicated in such words as Laxoparaffin.[9] Assuming its medicinal use to be understood by all, the geographic source is indicated in such terms as Russolax[10] in which any reference to the word paraffin was evidently regarded as superfluous. When paraffin has been employed in place of other unctuous substances, such as fats or fatty oils, its presence may be indicated as in "Paraffin Cold Cream;"[11] also *Paraffitoria*,[12] suppositories made with paraffin.

Other compounded forms are common, such as paraffin candle, paraffin wax, paraffin paper, etc.[13]

Adjective forms are found, *e. g.*, in paraffined (paper), paraffinic (nitrites), paraffinized (preparation) and paraffinoid (as opposed to benzinoid tars).[14]

The German language, which lends itself most readily to compounding of words, records the following: *Paraffinabscheidung*[15] and *Paraffinflitter*[16] (with reference to the form in which the paraffin separates from volatile oils).

E. K.

PODOPHYLLIC[17] ACID.

Podophyllic acid was first isolated and so called by Podwissotski[18] in 1882. He was unable to obtain it in a crystalline condition and believed it to be physiologically inert. Kuersten,[19] in 1891, showed that it is simultaneously produced with picropodophyllin,[20] from podophyllotoxin, *q.v.* He obtained it in a crystalline condition and expressed its composition by the formula $C_{20}H_{24}O_9$. Dunstan and Henry,[21] in 1898, prepared a gelatinous acid $C_{15}H_{16}O_7$ corresponding to the lactone picropodophyllin $C_{15}H_{14}O_6$ *q.v.* and showed that it was not an oxidation product as Kuersten had supposed. These relationships, ascertained by Dunstan and Henry, find partial expression in the following empirical formulas:

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[1] *Pharm. Journ.*, 57 (1896), 557.

[2] *C. & D.*, Mch. 1, 1919, adv. page 18; see also Liquid Paraffin, B. P. 1914, *Ph. Journ.*, July 26, 1919, page 64 of ads; see also Russolax.

[3] *Paraffinum liquidum.* See also *Petrolatum liquidum*, U. S. P. X.

[4] Soft paraffin.

[5] *P. molle. Am. Dr. & Ph. Rec.*, 23, page 190; from *C. & D.*; Comp. also *P. molle alb.* and *P. m. flav. Ph. Journ.*, July 26, 1919, first cover page.

[6] Solid or hard paraffin, also "Paraffin Wax" (*C. & D.*, Mch. 1, 1919, page 18 of ads).

[7] "*Paraffin Dur.*, B. P." *Pharm. Journ.*, July 26, 1919, page 64 of ads.

[8] *C. & D.*, June 30, 1928, page 119 of ads.

[9] *Arch. d. Pharm.*, 265, page 659.

[10] Russolax (see Card Index).

[11] *Ph. Zentrh.*, 65, page 34.

[12] *Paraffitoria* (*Ph. Zentrh.*, 66, page 835); also *Paraffitoria Belladonnæ* (*D. Med. Woch.*), Jan. 19, 1922, No. 3, page 11 of adv.

[13] See *Murray's New English Dictionary* for additional illustrations and quotations.

[14] *Ibid.*

[15] Gild., *Die aeth. Oele*, 2te Aufl. Bd. III, pages 491 and 616.

[16] *Ibid.*, Bd. II, page 640.

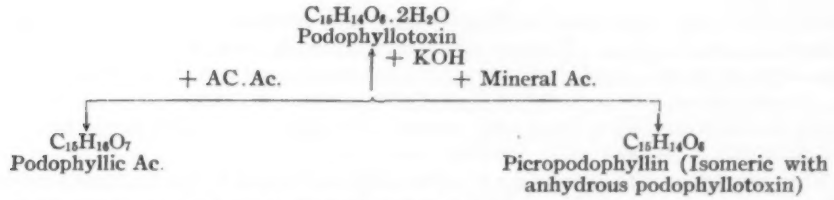
[17] For the etymological derivation see *Picropodophyllin*.

[18] *Pharm. Journ.* (3rd series), 12, pages 217 and 1011.

[19] See footnote [2] on page 255.

[20] See Podophyllotoxin.

[21] See footnote [3] on page 255.



Preparation.—Podwissotski[1] obtained the resinous podophyllic acid during the preparation of podophyllotoxin, when ether was added to the chloroformic solution of the impure product. Kuersten[2] isolated crystalline podophyllic acid by treating an alkaline solution of podophyllotoxin with potassium permanganate. Dunstan and Henry[3] prepared a substance, which, they suggested, was the same as Podwissotski's picropodophyllic acid and Kuersten's podophyllic acid, by boiling podophyllotoxin with alkali, cooling carefully and acidifying with dilute acetic acid. After a few hours the whole mass solidified to a transparent jelly. Every attempt to isolate the gelatin-like solid from the gel failed. The various salts prepared therefrom were used as a means of identification.

Properties.—The acid $C_{15}H_{16}O_7$ analyzed in the form of its salts is considered to result from the addition of the elements of a molecule of water to the lactone picropodophyllin $C_{15}H_{14}O_6$. From the aqueous solutions, well-formed crystals were obtained of the sodium, silver and copper salts.[4]

A. H. Uhl.

PICROPODOPHYLLIN.

This crystalline substance was first prepared from podophyllum and named by Podwissotski[5] in 1882. (From Gr. *πικρός* bitter, and Gr. *πους, ποδος*, foot + Gr. *φυ'λλον*, leaf.) He found it to possess the medicinal properties of the "resin" (Podophyllin, *q.v.*), but much more pronounced. Kuersten,[6] in 1891, obtained the same substance and suggested that it is an isomer of podophyllotoxin.[7] Dunstan and Henry,[8] in 1898, isolated a substance which had all the properties of Podwissotski's picropodophyllin and assigned to it the formula $C_{15}H_{14}O_6$. They regarded it as the lactone of podophyllic acid, also as isomeric with podophyllotoxin (see Podophyllic Acid). When treated with various reagents it yielded similar results to those obtained from podophyllotoxin.[7]

Preparation.—Podwissotski[9] obtained picropodophyllin by treating the alcoholic solution of podophyllotoxin, *q.v.* with slaked lime, drying thoroughly and extracting with alcohol. From the sufficiently concentrated alcoholic solution picropodophyllin crystallized in long, silky crystals. Kuersten,[6] prepared it by treating podophyllotoxin with alkalies. Thus, on heating podophyllotoxin with aqueous ammonia he obtained the crystalline product. Dunstan and Henry[8] boiled podophyllotoxin with alkali and obtained a white precipitate which was soluble in hot alcohol. On cooling, this solution deposited crystals in the form of a silky mass. These were purified by recrystallization from hot alcohol.

Properties.—This lactone which crystallizes in colorless, silky crystals melts at 227°. It is easily soluble in chloroform, acetone and hot alcohol, but nearly insoluble in cold water and cold alcohol. The taste is very bitter. It is optically inactive.[3]

A. H. Uhl.

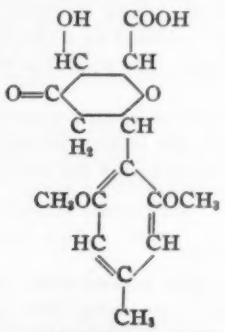
PODOPHYLLOTOXIN.

This substance was first isolated in an amorphous condition from *Podophyllum peltatum* and so named by Podwissotski[9] in 1882. It was regarded by him as the bearer of the cathartic

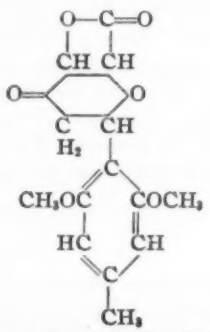
[1] See footnote [18] on page 254.
[2] *Arch. d. Pharm.*, 229, page 220.
[3] *Journ. Chem. Soc.*, 73, page 209.
[4] *Ibid.*, page 216.
[5] *Pharm. Journ.* (3rd series), 12, pages 217 and 1011.
[6] *Arch. d. Pharm.*, 229, page 220.
[7] See under Podophyllotoxin.
[8] *Journ. Chem. Soc.*, 73, page 209.
[9] *Pharm. Journ.* (3rd series), 12, pages 217 and 1011.

properties of the drug. Kuersten,[1] in 1891, obtained it in crystalline condition and assigned to it the formula $C_{22}H_{24}O_9.2H_2O$. Dunstan and Henry,[2] in 1898, isolated what they regarded as the same substance from *P. emodi*, but assigned to their crystalline product the formula $C_{15}H_{14}O_6.2H_2O$. Like its isomer, picropodophyllin $C_{15}H_{14}O_6$, it contains two methoxy groups. Both yield monobrom derivatives. When fused with potassa, they yield orcinol and acetic acid. When distilled with zinc dust, both yield dimethyl naphthalene.

When acted upon with aqueous alkali, podophyllotoxin yields, on the one hand, the isomeric crystalline lactone picropodophyllin $C_{15}H_{14}O_6$; and, on the other hand, a gelatinous acid $C_{15}H_{16}O_7$ of which picropodophyllin is assumed to be the lactone (see Podophyllic Acid).[3] This is regarded as identical with the picropodophyllic acid of Podwissotski (which Kuersten[1] looked upon as an oxidation product of podophyllotoxin). These related substances are regarded as derivatives of a substituted phenylated hydropyrone, *vis.:*



Podophyllic Acid[3]
(Dimethoxy, methyl-phenyl hydropyrone carboxylic ac.)



Picropodophyllin[4]
(Lactone thereof)

No structural expression is given to the isomerism of podophyllotoxin and picropodophyllin.

Preparation.—Podwissotski obtained podophyllotoxin (amorphous) by precipitating the chloroform extract of the rhizome with light petroleum[5] and Kuersten showed that by fractionally precipitating a chloroform solution of this crude podophyllotoxin the crystalline product can be obtained.[1] Dunstan and Henry extracted the official podophyllin, prepared, however, from *P. emodi*, with chloroform. The dark brown extract was boiled with benzene, and the hot benzene solution filtered into a cold flask and allowed to cool somewhat. By this means a good deal of resin was removed. The solution was then poured from the deposited resin, boiled for some time with animal charcoal, filtered, and set aside for several days, when almost colorless crystals of podophyllotoxin were obtained. These were purified by recrystallization either from a mixture of chloroform and light petroleum or from alcohol and water.

Properties.—The colorless crystals thus obtained with two molecules of water of crystallization $C_{15}H_{14}O_6.2H_2O$ melt at 117° and are readily soluble in alcohol, acetone, chloroform and hot benzene, but only slightly in water. Its taste is very bitter. $[\alpha]_D = -94°48'$. Anhydrous podophyllotoxin, obtained by crystallization from absolute alcohol, melts at 157°. The anhydrous product may also be obtained by heating the hydrate for a few minutes to 117°, dissolving the dried product in chloroform and adding dry light petroleum until the mixture becomes slightly turbid. After standing a few hours, the anhydrous substance crystallizes out. $[\alpha]_D = -78°4'$.

Anhydrous podophyllotoxin, when exposed to air and light for several weeks, acquires a purple color; the hydrated substance, however, appears to be quite stable under these conditions.

A. H. UHL.

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[1] *Arch. d. Pharm.*, 229, page 220.
[2] *Journ. Chem. Soc.*, 73, page 209.
[3] *Ibid.*, page 223.
[4] *Do.*, page 223.
[5] See footnote [9] on page 255.

PODOPHYLLO-RESIN.

This amorphous, physiologically active compound was first isolated and named by Dunstan and Henry[1] in 1898. All attempts to crystallize the compound were unsuccessful. However, a crystalline acetyl derivative was obtained from which the authors concluded that it probably had the formula $C_{12}H_{12}O_4$. They assumed that the physiological activity of the drug is partly due to this compound.

Preparation.—After the removal of podophyllotoxin and quercetin from the resin of podophyllum there remained a dark colored amorphous mass partly soluble in alcohol. After the purification of the alcohol-soluble portion, it is obtained as a reddish brown transparent substance softening and becoming semi-liquid a few degrees above ordinary temperature.

Properties.—An amorphous, reddish brown, transparent substance, soluble in alcohol but insoluble in petroleum ether, ether, chloroform, etc. It yields a crystalline acetyl derivative, and has a suggested formula of $C_{12}H_{12}O_4$.

A. H. UHL.

PODOPHYLLOQUERCETIN.

This yellow coloring material was first isolated by Podwissotski[2] in 1882, who obtained it in a crystalline form by sublimation. He found it to be without emetic or aperient action, but perhaps the cause of some intestinal pain which accompanies the administration of Podophyllum, Kuersten,[3] in 1891, concluded that it probably was not identical with quercetin, and assigned to it the formula $C_{22}H_{16}O_{11}$. Dunstan and Henry,[4] in 1898, considered it to be identical with the quercetin of quercitron bark.

Preparation.—Podwissotski[2] prepared podophylloquercetin from podophyllin. After extracting the resin with petroleum ether and chloroform, it was dried and exhausted with ether which removes this substance in a pure form. The ether was recovered and the residue treated with lead acetate, which forms a compound soluble in acetic acid. The lead compound was decomposed in the usual way and the reaction product exhausted with ether. On recovering the ether, podophylloquercetin appears as a yellow powder which may be obtained in a crystalline form by sublimation or by precipitation from an ammoniacal solution with ether. Kuersten[3] obtained it in much the same way, *viz.*, after the resin had been exhausted with petroleum ether and chloroform, it was extracted with ether. The ether being recovered, the residue was dissolved in cold glacial acetic acid. On standing crystals of podophylloquercetin appeared. Dunstan and Henry[4] prepared this coloring material by dissolving the residue from the ethereal solution of the resin which had been previously extracted with chloroform, in hot glacial acetic acid. On cooling crystals were obtained which had the properties of ordinary quercetin.

Properties.—Podophylloquercetin crystallizes in short needles of a yellow color and metallic luster. It melts at 247° to 250° at which temperature it decomposes, partially subliming to minute yellow crystals. It is soluble in alcohol and ether, sparingly soluble in chloroform and insoluble in water. With aqueous ammonia, potassa and caustic soda it forms bright yellow solutions. Its combinations with alkaline earths are insoluble. Continued action of alkalies decompose it. Exposure to air changes the color to green. Alkaline copper solution is easily reduced when warm, as well as ammoniacal silver solution. Kuersten[3] records its melting point as being 257° to 277°.

A. H. UHL.

SOME ASPECTS OF PROFESSIONAL PHARMACY.*

BY DEAN CHARLES B. JORDAN.

About five years ago Dean Spease told me of what, at that time, was probably a dream and now it has reached its fruition. He said that he hoped to form an

[1] *Jour. Chem. Soc.*, 73, page 209.

[2] *Pharm. Jour.* (3rd series), 12, pages 217 and 1011.

[3] *Arch. d. Pharm.*, 229, page 220.

[4] *Jour. Chem. Soc.*, 73, page 209.

* Address before Academy of Pharmacy and Northern Ohio Branch, January 12, 1932.

See page 86.

association of the pharmacists of Cleveland that would be similar to corresponding sub-groups in Medicine, College of Surgeons, etc. Since pharmaceutical education is my life's work, naturally I was much interested in the project and asked many questions about it. Later an article appeared in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION setting forth these ideas and a few weeks ago there came to my desk *Bulletins 2 and 3* of the Academy of Pharmacy. All of us at Purdue were immediately interested and I wrote Dean Spease for more information. This probably accounts for my invitation to address you and therefore my presence here to-night.

The idea of an organization of selected pharmacists is not a new one. Arny's Institute of Pharmacy and Nelson's Trade Marked Pharmacies have been described in pharmaceutical publications, but it remained for the pharmacists of Cleveland to take the first concrete step toward the formation of such a group. You are indeed to be congratulated on this step which, as I see it, bids fair to become the outstanding event in pharmaceutical practice of this decade.

For the past four years I have been studying professional pharmacy and the results of these studies have appeared yearly in the JOURNAL OF THE A. PH. A. Perhaps some of you have read these papers. From these studies four facts seem to stand out:

First.—That the development of professional pharmacy is in its infancy but is growing very rapidly. About 45% of these strictly professional pharmacies have been started in the past decade and over 35% of them during the past five years. I believe we may look for a continued development because some very large cities seem to have none of them at present. We all admit that this development must be limited but we are far from the saturation point yet.

Second.—If you start a professional pharmacy, you may expect it to be a losing proposition for six or twelve months. One of the most successful professional pharmacies in the United States, that of Dr. Leonard Seltzer of Detroit, was a financial failure for over a year. Dr. Seltzer said that he filled on the average of three prescriptions a day for the first year. We all know that is not sufficient to pay the rent. However, a determination to pursue an ideal has won for him great personal satisfaction and financial success. Many of the professional pharmacists who gave me the data told a similar story. I believe that only a small percentage of these professional pharmacists were financially successful from the beginning.

Third.—Choice of location is a very important factor in the success of such an adventure. It will require twenty or thirty doctors to each successful prescription store and the store should be located in close proximity to the doctors' offices. This is well illustrated in the city of St. Louis. Within a radius of two blocks there are four successful professional pharmacies and four successful commercial drug stores. This center happens to be the busiest corner in St. Louis, although out in the fifty hundred block, and there are many office buildings with the offices occupied by physicians. One pharmacist who has been very successful with a professional store in one of our cities, told me that his business was failing because a new Medical Arts Building was erected and the physicians had moved from his neighborhood to that new building. Moral: "Move with the doctors." Other things being equal or nearly so, the patients will patronize the most conveniently located professional pharmacy.

Fourth.—If you are successful in the operation of a professional pharmacy, you may expect a good return for your investment and for your labors. Usually the cost of installation is small; rents are low, as you will not need the best corner in the city for your place of business; and overhead is low because of low investment and low rents. Several of these professional pharmacies are making 20% profit on their volume of business which is what should be expected of such a professional practice. I know of no more attractive field than this in pharmacy to-day. If I were a young man, I would certainly endeavor to open a professional store. In addition to the return on investment, the satisfaction of doing a purely professional business must be very gratifying.

Less than fifty years ago many states had no pharmacy laws and anybody who wished could open a drug store and compound prescriptions and sell poisons. My own state secured its first pharmacy law in 1899, only a little more than thirty years ago. When these first laws were secured, all who were practicing pharmacy for a period of years, five or ten, were registered without examination. These early laws placed very low requirements for entrance to the profession, four or five years of experience plus the passage of an examination. Often this experience consisted of time spent behind the soda fountain or the candy and cigar counters and the examinations were ridiculously easy. We can readily understand that, as a result of these low standards, pharmacy was flooded with incompetent and poorly trained practitioners, many of whom were in the business purely to gain a livelihood and therefore knew nothing and cared less about professional ethics. In my own state we still have a number of these men who were registered without any examination as to their competence to perform the professional duties they had assumed and, of course, we still have a great many who became registered when the bars of entrance were very low. However, I must pause here to give credit to some of these men who were registered without examination. Some of them are among our best practitioners to-day. They were imbued with a desire to render good professional service and therefore they were guided by professional ethics, but they are the exceptions that prove the rule. What was true in Indiana was also to a greater or less degree true in the other states. The first law requiring college training for entrance to pharmacy was secured in New York State.

It would seem almost impossible for a professional spirit to make headway against such terrific odds. However, fortunately for pharmacy, two national associations were organized in the early years of the twentieth century and these two organizations, the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy, soon became champions for better trained pharmacists and better pharmacies. Later, the AMERICAN PHARMACEUTICAL ASSOCIATION, the Mother Association of Pharmacy in the United States, caught the spirit of her children, the A. A. C. P. and the N. A. B. P., and came to their assistance.

The corner drug store has become a recognized factor in our economic life and, even though we have a great many more drug stores than are necessary for the sale of professional items, we cannot dispense with the conveniences that the corner drug store offers. 'Tis true that we have multiplied our drug stores far beyond reason, but the fact remains that our citizens wish the conveniences that they offer and there will never be a time when all the drug stores can become financially successful from

the compounding of prescriptions and sale of sick room supplies. Since this is true we must expect a great percentage of our drug stores to continue to do a commercial business along with professional practice. These two are not incompatible if the druggist has a proper conception of professional ethics. In my own town of 30,000, we have no dispensing physicians and no professional pharmacies. One of our larger stores, a store that orders paint by the car load and stock food in ton lots, does an excellent professional business. They employ five registered pharmacists, all of whom are college graduates, and every prescription that is brought to that store receives as much care and scientific treatment as it would in a professional pharmacy. The same is true of every store in the city, except perhaps one or two. They employ registered men who are college graduates and they live carefully up to the code of professional ethics. Several attempts have been made to open a professional pharmacy in my city but they have been abandoned because the present stores have a following among the physicians, and the physicians are satisfied with the professional service they are receiving. I speak of this only to emphasize that commercial transactions are not incompatible with good professional ethics if the operator of the store is the right kind of pharmacist.

I know of no profession, no matter how high its ideals nor advanced its code of ethics, that does not have among its practitioners some who are not motivated by these ideals and professional ethics. Pharmacy is no exception is this regard and, unfortunately, we have in the profession men who are in it merely to gain the almighty dollar and who use the professional atmosphere as a cloak of respectability to further their success in securing the dollar.

In practice we have at the head the strictly professional pharmacy operated in accordance with pharmaceutical ethics and at the foot the purely commercial store whose operator cares nothing about pharmacy except as it brings money into his till. Between these two we have all grades of practitioners and it is difficult for an outsider to distinguish the true from the psuedo pharmacists. We need some sort of instrument to separate the sheep from the goats and to place its stamp of approval upon the man who is *first* a true pharmacist and second a business men. I take it that this is one of the objects of the Academy of Pharmacy and I am in hearty accord with this aim. As long as we have registered pharmacists who fail to live up to pharmaceutical ethics we will have need of some way of distinguishing them from the one who does. Since it is impossible for our pharmacy laws to make this distinction, and no law can ever do it, we must look for some other source of classification that the physicians and the laity can use.

The physicians of Cleveland should welcome this instrument of classification of pharmacists and should coöperate with you. If we are to restrict the sale of questionable patent medicines, the practice of self-medication and the forcing upon the public of trade-marked articles at a high price when the same thing can be secured under its chemical name at a much lower price, it will have to be done by the physicians coöperating with the ethical pharmacists to stop such practices. The laity does not know who the ethical pharmacists are and, unfortunately, the physicians do not always know either. Here we have that much needed instrument of classification.

It has been an honor and a pleasure for me to address you and my hearty approval and well wishes go with you in your effort to advance the cause of public health.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

"Dr. Leonard Seltzer's wide experience in prescription compounding and pricing makes him a competent authority on the subject. The following paper by Dr. Seltzer presented before the Section on Pharmaceutical Economics of the American Association of Colleges of Pharmacy at the Miami meeting will be of interest to all who are following professional pharmacy. I trust that Dr. Seltzer's paper will arouse some discussion.—C. B. JORDAN, *Editor*."

EQUITY AND ACCURACY, ESSENTIAL ELEMENTS IN PRESCRIPTION PRICING.

BY LEONARD A. SELTZER.*

In the practice of professional pharmacy, so often referred to as ethical pharmacy, possibly for the reason that in professional practice the standards of ethics are most difficult to maintain, the outstanding problems are those of *quality* and *price*. Surrender in the matter of either of these, whether from indifference in the matter of computing prices or habitual unscrupulousness in the matter of material supplied, is fatal both to the maintenance of ethics and of character. The question of substitution being wholly a moral one will not be taken up at this time; the matter of pricing, being a technical one, is the one to which this discussion will be limited.

If there is one thing that is paramount in the practice of professional pharmacy, it is that the pharmacist cultivate and maintain the confidence of his clients, and in maintaining this confidence one of the most sensitive and vital points of contact is that which is involved in the pricing of prescriptions: sensitive on the one hand because of the reliance which the customer, willing or not, must place in his pharmacist and vital on the other hand, because the reputation of the latter for honesty, good faith and competency is involved. But not only is the point of contact one of the most sensitive and vital, it is also one of the most complex—complex, because factors so diverse as those of the time, service, cost and overhead in almost kaleidoscopic variation must quickly and accurately be converted into terms of dollars and cents.

The unscientific method of pricing which has been and is at present quite generally in vogue does not lend itself to the establishment of this confidence: in fact the opinion that the public is exploited is more or less generally accepted as a fact and this opinion will not be altered until the unscientific method shall have been changed for a scientific one and the conscience of the pharmacist, which may in some instances "With injustice be corrupted," be thrice armed because his price is just.

If selling prescriptions were merely merchandising, the solution would be simple: a fixed rate per cent markup would solve the problem. But no rate per cent advance based on cost of material can be found that will be applicable both for a prescription for one-half ounce digalen and one for a dozen one-tenth grain calomel powders for example. Or, from another angle, if two prescriptions be com-

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pared each specifying different materials but costing the same amount (say $1.00 for example), and if the mode of administration of one be such as to cause it to be used up in a week, and of the other, such as to last a month, the first patient would have to refill his prescription four times to get a month's treatment. Manifestly, no equitable price could be computed, based on the cost of material alone: the fact that the first patient's medicine was used up so much faster should have a *modifying effect* on the price he has to pay. He would of course have to pay more than the second patient, but he should not pay four times as much.

And so, to accomplish the equitable pricing of prescriptions, a system is necessary which will enable all the elements involved to be reflected in the price, and the first thing to do is to find out what these elements are—to discover, if possible, whether certain factors exist which might enter into the computation and if so what they are and how many. These factors in order to function as such would have to

FORMULA FOR PRESCRIPTION PRICES

Compounding Fee + Service Charge + Material (Selling Price) = Price

Classification	C +	S	+ M	Price per C No.	EXAMPLES $ .50	$ 1.00	$2.00
Tablets and Ready Made Pills	.50 +	No. of Doses X ½ Cent	+ Selling Price	20	.70	.80	1.00
				50	1.00	1.25	1.75
				100	1.50	2.00	3.00
Capsules, Cachets Powders Hand Made Pills Suppositories	.75 +	No. of Doses X One Cent (Suppositories) X Six Cents	+ Selling Price (minimum 2c per oz.)	No.	C + S +		M = P
				20	.75 + .20 +		.40 = 1.35
				50	.75 + .50 +		1.00 = 2.25
				100	.75 + 1.00 +		1.00 = 2.75
Liquids	.75 +	No. of Doses (Drams) X One Cent	+ Selling Price (minimum 5c per unit)	Oz.	$	$	$ $
				2	.75	.16	.10 = 1.00
				3	.75	.24	.15 = 1.15
				4	.75	.32	.20 = 1.25
Ointments	1.50 +	No. of Drams X One Cent + (minimum 12½c per oz.)	Selling Price	1	1.00	.15	1.00
				2	1.50	.25	1.50
				3	1.50	.40	1.90
				4	1.50	.50	2.00

Fig. 1.

be universal, *i. e.*, they would of necessity be present in every prescription and they would have to be comprehensive, *i. e.*, they would of necessity include every phase of service that enters into the cost. Difficult as this problem may seem, a similar one had been encountered and solved in other forms of service.

The mail and express service, the telephone service, the electric light and power service all presented an array of facts seemingly unrelated, and yet each service elaborated a schedule by uncovering certain constant essential factors which would produce an equitable rate. In the case of mail and express there were three: service (of various classes), weight of package, and distance; in the case of telephone service there were three: service, number of potential calls (*i. e.*, number of subscribers subject to call), and number of actual calls made; in the case of electric light and power there were three: service, current subject to demand, and current actually consumed. These results in the matter of determining rates were suggestive and helpful in the problem of prescription pricing. For here, too, there was the

same conglomeration of unrelated facts, and here, too, three factors were found which were always present and which fully met the requirements in all cases: they were Factor C—the compounding fee, including the clerical work of filing, labeling, checking, assembly of material and compounding; *second*, Factor S—the professional service charge, the measure of which is the number of doses supplied; *third*, Factor M—the selling price of material used. A *fourth*, Factor X, might be added to represent such extraordinary phases as charges for dispensing liquor or narcotics. In most presciptions the value of this factor would of course be zero.

It will be noted that there is no prescription in which these three factors do not all occur, nor is there any prescription not fully covered by them; moreover they do not interfere with nor overlap each other. The algebraic formula for pricing prescriptions C + S + M + X = Price, is therefore mathematically accurate. It

Fig. 2.—Table showing the value in cents of one ounce (including a profit of 40%) on preparations ranging from $1.00 to $18.00 net per dozen in price, and from one ounce to twenty ounces in size.

No. of ozs. in original pkg.	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	Unit price
$1.00	14	7	5	4	3	3	2	2	2	2	2	2	1	1	1	$ .08
2.00	28	14	10	7	6	5	4	4	3	3	3	3	2	2	2	.17
3.00	42	21	14	12	9	7	6	6	5	4	4	4	3	3	2	.25
4.00	56	28	20	14	12	10	8	7	6	6	5	5	4	4	3	.34
5.00	70	35	25	20	14	13	10	9	8	7	7	6	5	5	3	.42
6.00	84	42	28	21	17	14	12	11	10	9	8	7	6	6	5	.50
7.00	98	49	35	25	20	19	14	12	11	10	9	8	7	6	5	.60
8.00	112	56	40	28	23	19	16	14	13	12	10	10	8	7	6	.67
9.00	125	63	42	31	25	21	18	16	14	13	12	11	9	8	7	.75
10.00	140	70	50	35	28	24	20	18	16	14	13	12	10	9	7	.84
11.00	154	77	55	39	31	26	22	20	17	16	14	13	11	10	8	.92
12.00	168	84	60	42	34	28	24	21	19	17	15	14	12	11	8	1.00
14.00	196	98	70	49	40	33	28	25	22	20	18	16	14	12	10	1.17
16.00	224	112	80	56	45	38	32	28	25	23	20	18	16	14	12	1.34
18.00	250	125	84	63	50	42	36	32	28	25	23	21	18	16	14	1.50

Rule for competing the price of any number of ounces, of any per cent, at any price per ounce so as to yield 40% on material; multiply the price in dollars per avoirdupois ounce, by the per cent, by the number of ounces, by two.

only remains for each store to assign for each factor the value warranted by the service rendered in that store in order to be assured of uniform prices by whomever computed—the *sine qua non* in any pricing scheme.

No attempt is made to effect uniformity of prices in different stores which from the very nature of the thing would be inequitable and even impossible since the value assigned to factors is based on service rendered and that service is not on the same plane in different stores. The fact of the price of a prescription being determined by the consideration of these factors might lead to the impression that it would tend to increase the average price and also the gross returns in proportion to the number of prescriptions compounded. This is not the case. If the factors are properly evaluated they will not increase nor even change the *average price*, they simply distribute the load to where it belongs, giving each individual prescription the proper charge. Under the old system the average price

of one hundred prescriptions might be and probably was correct, but that was no assurance that any one individual prescription was properly priced. By the employment of the formula every prescription is correctly priced and it follows that the average will take care of itself.

And now with respect to the application of the algebraic formula: prescriptions are first classified with reference to the amount to be charged as compounding fee. Obviously the fee, Factor C, for prescriptions for ready made pills, capsules, tablets, etc., should be the lowest. Placing it at $0.50, the fee for liquids, hand-made pills, capsules, cachets, suppositories, etc., should be a trifle higher, say $0.75, and the fee for ointments which require the most skill and attention, a still higher fee, say $1.50.

In assigning value for the second factor (S): the service charge in the first class involving the least work of all per dose, would carry the smallest fee, say one-half cent each per dose; in the second class the fee should be correspondingly higher, say one cent per dose except in case of cachets and suppositories in which cases an account of the additional work on each individual dose, the fee should be more, say four cents and six cents, respectively; in the third class (ointments), the dose of one dram is taken arbitrarily as a working basis and the fee of one cent per dram assigned.

No. of grains	1	2	3	4	5	6	7	8	9	10
Net price per oz.										
$1.00	1	1	1	2	2	3	3	4	4	4
2.00	1	2	2	3	4	5	6	6	7	8
2.50	1	2	3	4	5	6	7	8	9	10
3.00	1	2	3	5	6	7	9	10	10	12
4.00	2	3	5	6	8	10	11	12	14	16
5.00	2	4	6	8	10	12	14	16	18	20
6.00	3	5	7	10	12	14	16	18	21	24
7.00	3	6	9	11	14	16	19	21	24	28
8.00	4	6	10	12	16	18	21	24	28	32
9.00	4	7	10	14	18	21	24	28	32	36
10.00	4	8	12	16	20	24	28	32	36	40

Fig. 3.—Table showing the value of material (including a profit of 40%) in quantities ranging from one to ten grains for material, costing from $1.00 to $10.00 per ounce.

For the third factor (M), the usual selling price is accepted—where no such price is established a markup of 40% is convenient because pharmaceuticals are generally listed on that basis; morever it is reasonable and it is easily computed. There is of course a minimum below which cost cannot be considered. For obvious reasons material costing one cent or any trifling amount could not be sold on a 40% markup. The selling price in such a case must be placed at a minimum at which it can be dealt in. We have found it expedient to price liquids at the minimum rate of five cents per ounce; and for material in capsules, powders, etc., at the minimum rate of two cents each up to the point where the cost exceeds 60% of this amount. Under this arrangement when fifty or more are prescribed so that the selling price of the material charge amounts to $1.00, the amount is not increased indefinitely: thus, 100 five-grain soda and magnesia powders would carry only a $1.00 material charge and not two cents each for the hundred.

Now while prices computed by this formula are just and equitable there are times when the exercise of judgment is necessary. We have the authority of Holy Writ that while certain things may be lawful they may not be expedient, for instance, a standard proprietary, pint size, costing $1.00 would be under strict adherence to schedule call for $3.65, it would not be good judgment to charge that price. In fact when a standard preparation is prescribed in original package and the service consists in no more than affixing the label prescribed by the physician, a fee of $0.25 above the regular selling price is more likely to be mutually satisfactory. But

considerations of expediency are not the only occasions for suspending the application of the schedule. All laws are limited in their application, even the law of indestructibility of matter, the immutability of the atom and the conservation of energy are no longer considered universal in their application. An attempt to apply the schedule for one pill or powder, or one dose of liquid would of course not be using common sense. In case of ointments, $1.00 for one ounce, $1.50 for two ounces and the schedule in larger anmounts is more likely to meet approval than a strict adherance to the schedule for all amounts. Further adjustments such as eliminating Factor S and increasing the minimum value of M to 0.25 per ounce for medicine administered in less than thirty-drop doses except S. S. Potassium Iodide for which special rate must be made; also eliminating the factor S in gargles, lotions and injections, increasing the minimum for M to ten cents in the latter instance.

There are included three tables. Figure 1 illustrates the application of the schedule to the different classes of prescriptions. Figure 2 is a table showing the selling price of one ounce of preparations ranging from eight cents and $1.50 per package in price and from one ounce to twenty ounces in size. Figure 3 shows the selling price of substances in amounts ranging from one to ten grains and in price of from $1.00 to $10.00 per ounce.

Finally then, the accuracy and equity of prices rests on the *one responsible for the store* and its reputation will stand or fall as the public approves or not. Such a schedule as the one described puts the means in his hands of controlling the prices made whether he is present or not. Should he find his prices either too high or too low, instructions to change the value placed on one or more factors or better still, instructions to increase or decrease the result by whatever per cent he deems necessary, will accomplish the result. It gives control to the man in control: it enables him to aim at what he wants to hit and hit what he is aiming at.

PORTRAIT OF DEAN E. V. HOWELL PRESENTED TO U. N. C. SCHOOL OF PHARMACY.

A portrait of the late Dean Edward Vernon Howell, head of the School of Pharmacy at the University of North Carolina from its beginning in 1897 until his death on February 14, 1931, was presented to the School with appropriate exercises on the afternoon of February 15th. The portrait is the gift of J. Edward Murray, vice-president and treasurer of the Emerson Drug Co., and a nephew of the late Captain Isaac E. Emerson. Mr. Murray was graduated from the University's School of Pharmacy with the class of 1913 and has shown keen interest in its progress. Dean Howell and Mr. Murray were close friends. The portrait was painted by William Wirtz, Baltimore artist, who knew Dean Howell personally. It is an excellent likeness. The exercises were held in the library of the Howell Hall of Pharmacy, so named by the trustees for the late Dean, and were attended by a large group of relatives, colleagues and students. G. C. Hartis, of Matthews, president of the Senior Class in the Pharmacy School, presided. F. O. Bowman, general counsel for the North Carolina Pharmaceutical Association, presented the portrait in behalf of the donor who was unable to be present. It was accepted for the School by Dean J. G. Bear, Mr. Howell's successor, and in behalf of the General University by President Frank P. Graham. Then Dean W. W. Pierson of the Graduate School delivered a memorial tribute in behalf of the Edward Vernon Howell Memorial Committee appointed by President Graham.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor will also undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

ADVERTISING AND SELLING PROBLEMS IN DRUG STORES.

ADVERTISING MEDIA.

BY PAUL C. OLSEN.

One of the fundamental requirements of a successful advertising campaign is that the merchandise and services offered in the advertisements shall be easily obtainable by persons who read the advertisement. This is simply another statement of the well-known principle that the forces of demand creation and those of physically supplying the demand created shall be as closely coördinated as possible. The greater the degree of this coördination, the less the waste.

It sometimes is true, of course, that manufacturers deliberately advertise merchandise and services for sale in areas in which the merchandise and services are not then available. The purpose of such advertising is to force distributors in that area, as a result of the demand created, to take the necessary steps to physically supply this demand.

This is an exception, however, which does not apply with any force to the advertising of retail stores. In newspaper advertising the area in which the newspaper circulates should correspond, as closely as possible, to the trading area of the store advertising. The greater the lack of correspondence in these two areas, the greater the waste and, consequently the higher the costs of the newspaper advertising thus used.

As a result of the facts set down above, it is obvious that the larger the city in which a drug store is located and the more remote it is from such a city's central shopping area, the less the opportunity for effective newspaper advertising. Practically the effect of this restriction is to eliminate entirely profitable newspaper advertising by city neighborhood drug stores.

Only a moment's consideration is necessary to show why this is true. The *New York News*, a morning tabloid newspaper, has the largest circulation of any daily newspaper in the city of New York. It reaches on week-end mornings over 1,300,000 families in the city of New York and surrounding metropolitan areas. There are almost 4000 drug stores within the corporate limits of the five boroughs comprising the city of New York. A great majority of these drug stores are neighborhood drug stores. The fact that nearly 4000 drug stores can exist within the city of New York is an indication that the area which each drug store serves is

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small. As a matter of fact, with about 1,600,000 families in the city of New York and nearly 4000 drug stores there, the average number of families per drug store must be about 400.

A city neighborhood drug store with 400 families more accessible to it than any other drug store if it is to use newspaper advertising in order to reach these 400 families must, if it chooses the *New York News*, advertise not only to these 400 but to over 1,300,000 other families. The waste of such a procedure is obvious and naturally eliminates from consideration for a neighborhood drug store in large cities the use of daily newspapers.

This situation also shows clearly one of the inherent advantages possessed by city center drug stores and by chain drug stores in their competition with individually owned neighborhood drug stores. A chain drug store organization in the city of New York might have stores accessibly located in all the shopping areas of the city. This would mean that a very large proportion or even practically all of the more than 1,300,000 families who buy the *New York News* every day could reach these stores with little departure from their daily routine.

It will be seen that newspaper advertising of a group of drug stores in such a manner may be productive and profitable because of the close coördination of the demand created by the newspaper advertising with an accessible means of supplying that demand. The cost of such an advertising campaign can be low not only because of the elimination of waste, but also because of the comparatively small cost of the advertising when divided among a large number of non-competing stores.

The effect of this situation is to eliminate for many thousand drug stores in this country the use of newspaper advertising as a means of creating demand for the merchandise and services offered in these drug stores. This is a handicap. There is no doubt about that.

The handicap would be more obvious if it were applied to window display, for instance. Suppose there were a requirement that no drug store be allowed to display merchandise in its windows. The handicap would be more easy to see, but no less real, than the one which exists to-day for many drug stores in the economic and profitable creation of demand by newspaper advertising.

Two means have been suggested for overcoming this handicap. One is cooperative advertising by a group of druggists whose stores serve all, or virtually all, of the areas in which a city newspaper circulates, yet whose stores are sufficiently separated from each other as not to be competitors.

When such coöperative campaigns have been successful, their success has been due, in large part, to the energy and self-sacrificing devotion to the interests of all by one or a few persons who are responsible for the successful direction of the advertising and the required concurrent merchandising activities.

If, for instance, an advertisement in such a coöperative campaign is proposed on the subject of first-aid supplies and contains, perhaps, a list of first-aid supplies which should be in every home and, perhaps, also the offer of a free booklet on first-aid procedure, it is necessary, if the campaign is to have the greatest productiveness, for all the stores coöperating in the advertising campaign to have an adequate stock of this merchandise and to display this merchandise in the windows and in the stores so as to reinforce the demand created by the newspaper advertisement.

A further requirement in a coöperative campaign of this kind is some means of identification by which a person who reads the newspaper advertisement may know the particular store accessible to him at which this merchandise can be purchased.

A group of druggists in Newark, New Jersey, have carried on for some time a newspaper advertising campaign of this nature. Each contributes weekly a small amount of money which pays the cost of the newspaper advertising space used co-operatively and the other merchandising services necessary in order to obtain the fullest results from the advertisements.

The drug stores in this coöperative group are called the Independent Druggists' Alliance. Each store has exterior and interior arrangements which identify it as a member of the group. In this way the necessity of listing in each newspaper advertisement all the members of the group coöperating is eliminated and the space thus saved can be used for creating a desire for merchandise and services available in the stores advertising.

Similar coöperative campaigns in neswpaper advertising by drug stores have been undertaken with some success in other cities.

Newspaper advertising has accumulative effects. It is, therefore, necessary in a successful coöperative campaign for the advertising to be extended over a sufficiently long period for this advertising to begin to receive some of these accumulative results. Otherwise, individual stores contributing are likely to become dissatisfied before the advertising campaign really has continued long enough to prove its value.

Furthermore, the profits obtained from such a newspaper advertising campaign are difficult to measure definitely. It is important, therefore, for the directors of the campaign to devise methods of determining from time to time the results being obtained by the members contributing. This helps to maintain the continued interest of coöperating stores.

Inasmuch as coöperative newspaper advertising campaigns of this kind are paid for by a group of individual drug store proprietors, it is natural that many of these individual proprietors should have ideas about how the campaign shall be conducted—the items and services which shall be featured and the form in which they shall be featured in the newspaper advertisements. Here, again, great tact and understanding must be possessed by the directors of the advertising campaign. They must have, as well, an open-minded willingness constantly to test the effectiveness of ideas for the campaign sugested by the individual druggists who are paying its cost. It will be seen, too, that in the planning of a coöperative newspaper advertising campaign of a group of individually owned drug stores in a city, there will be practical difficulties in the selection of coöperating drug stores of equally high standards. That is why, in the I. D. A. campaign in Newark, for instance, it was considered absolutely necessary to include, as an integral part of the coöperative advertising campaign, a service which had as its purpose the raising to an equally high level the professional and sales standards of all the stores included.

The neighborhood newspaper is sometimes suggested as a second means by which individual drug stores in city neighborhoods can obtain most of the advantages of newspaper advertising.

The city neighborhood newspaper is fundamentally the same in its objectives and purposes as daily and weekly newspapers in small communities. The appeal of the daily or weekly newspaper in small communities is its emphasis upon local news. People are familiar everywhere with small communities, many of them close to large cities and in which the newspapers of these large cities circulate extensively; yet in these communities local daily or weekly newspapers occupy a place and furnish a service which cannot be replaced by out-of-town metropolitan newspapers.

Neighborhood newspapers in large cities justify their existence for the same reason. Sometimes large cities are formed by a consolidation of a group of small adjacent communities. The community interests of the former separate sections persist. The local or neighborhood newspaper continues as a tangible expression of this interest.

In Seattle, for instance, a city of nearly 400,000 population, the *West Seattle Herald* is a weekly devoted to the local interests of one section of the city. Probably the best known and largest development of the neighborhood newspaper is the *Bronx Home News* which serves primarily the local interests of that huge section of the city of New York north of the Harlem river. In Philadelphia, the *Olney Times* has existed for more than 20 years as a local newspaper of one residential section of the city. Other neighborhood local newspapers in Philadelphia have even longer histories.

It will be seen, however, that the community interest obtainable by a newspaper serving a neighborhood section of New York, Philadelphia or Seattle is not as great nor as unified as this interest would be in a more isolated community.

When a drug store proprietor considers a newspaper advertising campaign in a city neighborhood newspaper, it is necessary, therefore, for him to assure himself, first of all, of course, that the circulation of the newspaper corresponds to the trading area served by his store. More important, it is necessary for him to assure himself of the reader interest which exists in the city neighborhood newspaper. There is likely to be much more variation in this reader interest among various city neighborhood newspapers than there is in local newspapers serving more isolated communities.

Other advertising media available for advertising campaigns for drug stores in city neighborhoods and in other localities will be the subject of the next article in this series.

PROFESSIONAL PRESTIGE.[1]

BY H. O. TIEGEN.[2]

A profession is defined as that of which one avows or claims an intimate and thorough knowledge, also a collective body of persons engaged in a calling.

Prestige is used in the sense of its meaning, as an influence derived from character or reputation.

Professional prestige then would be the character or reputation of an individual or a profession based on the influence of the person or profession with regard to the service rendered to humanity.

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[1] A paper presented before Minnesota Pharmaceutical Association.

[2] Moorhead, Minn.

In the last decade or two, we have been engulfed in a wave of commercialism, high pressure salesmanship, where the main objective was to sell goods; to make a profit was the principal consideration. Volumes have been written on how to separate the public from its money, pleasingly and without the use of an anæsthetic—painless extraction. What has it left us?

With the coming of an era of depression, we find that the methods that were so successful during boom times are no longer as effective as of yore. Our community bargain days, special sales, giving away free, merchandise that formerly constituted important sources of income to the retail druggist such as tooth pastes, tooth brushes and safety razors, no longer have the customer appeal that they once possessed. Probably the fact that you save the customer from buying these articles is rendering him a service, but is it?

Economists tell us that a business transaction should result in a mutual benefit to both parties, but I fail to see the benefit to the dealer in giving away merchandise that would and should bear its share of the burden of overhead or expense.

A century ago the philosopher Comte said, "Every person who lives by any useful work should be habituated to regard himself not as an individual working for his own benefit, but as a public functionary working for the benefit of society; and to regard his wages of whatever sort as a provision made by society to enable him to carry on his labor." The philosophy of Comte considered the remuneration for the service rendered as part of the transaction, the result—a mutual benefit. In business as in mathematics, one side of the equation should balance or equal the other side.

The result, as I see it, of this departure from mathematical and economic methods of procedure is an uncertain mental attitude on the part of the public toward retail methods of distribution, and a false idea of the relation of costs and profits. Considering the vast differences in the selling price of staple commodities, it is only natural that the public should believe that everything must be profit, or else the quality must be poor; most people being convinced that retail profits are large. This is the natural consequence of an era of price appeal instead of quality or service appeal.

There has been a decided trend toward a return to fundamental principles in pharmacy and to a utilization of the unique advantages inherent in the scope of the practice of pharmacy. Pharmacists are beginning to see the benefits that can accrue through intelligent and persistent efforts to enhance and increase the professional phases of their business. The strictly professional side of pharmacy cannot be built in a day or a week. It takes time, work and may entail a certain amount of sacrifice.

The controversy between commercialism and the professional attitude in life is recognized and discussed by prominent sociologists. Ross says:

"There is no surer sign that current American civilization is unripe, provisional and destined to be profoundly modified than our habit of applying business standards of success in situations where they ought not to be applied. Only time will tell whether the big outstanding tone-giving business men can be persuaded to turn their backs on mammonistic standards of achievement and to apply to their colleagues more worthy social and satisfying standards of success. The increasing prominence of capital in the practice of an art or profession tends to subordinate the artistic or professional conscience to profit. The fact is the path of man's advance is strewn with discarded

commercialisms. One might almost sum up the moral side of social progress as the expulsion of the profit motive from those parts of the social order in which it has no business to be."

What has this to do with pharmacy? If the philosopher, sociologist and economist are right in their deductions, then the only enduring phase of pharmacy is the professional aspect. Our ability as merchandisers may be essential, but it is no different from that of any other merchant. What gives us special privileges, special recognition, is our ability to render a service to our fellow men which other merchants cannot do. This does not mean that we must cease to merchandise, but rather that we should make the most of the scientific basis of our business, build up a professional attitude and spirit, capitalize our scientific connections, background and traditions.

Strictly commercial organizations are strong for this scientific service appeal to humanity, linking up their products with great scientific discoveries in the hope that those who hear and read will draw the conclusion that their products are of a like nature, a great benefaction to mankind. These stories of the discoveries of great scientists make interesting and fascinating copy, attract attention and hold interest whether in newspaper or over the radio. Why not use this setting where it belongs, with medicine and pharmacy?

I have listened with a great deal of interest and fascination to the weekly dramatic radio programs setting forth the important medical and biological discoveries and the invaluable services to mankind that have resulted from the works of these patient, tireless, hardworking men of science, who devote all their time and often sacrifice health and even life to further their researches that humanity may be benefited.

Lister, Pasteur, Koch, Jenner, Banting, Ehrlich and others have left in our care a priceless heritage, and what do we do with it? Throw it in the discard as so much rubbish? No. There are a few minds that are still endeavoring to keep alive this spirit of truth, this devotion to service, to fan the ember in the hope that it may blaze forth as a bright flame to illuminate mankind and spread the gospel of service that goes with it.

There are many ways in which the pharmacist may render professional service to the community, enhance his reputation and gain much favorable prestige. In the field of biology and bacteriology there are many opportunities for interesting and profitable contacts with physicians, as well as the general public. Pasteur laid the foundation of preventive medicine through his researches in bacteriology. Many of the former scourges of mankind are now rare or unknown due to the work of a comparatively small group of men. The physicians and the pharmacists are the two groups of men who should sell the public the idea of prevention of disease as well as the alleviation of ills that do occur.

The preparation of sterile solutions, ampules for hypodermatic and intravenous use, clinical laboratory work such as the analysis of blood, urine, gastric contents, water supply, etc., are within the scope of the pharmacist's work and should be performed by him. This would deter the founding of clinics often with dispensaries connected with them. The compounding of a prescription in such a manner as to bring forth the greatest benefits from the remedy constitutes a very important part of the work of the pharmacist.

I recently read the report of one of New York's leading dermatologists who made the statement that he always specified ointments made by certain manufacturers because he knew they were free from irritant, gritty particles which were so often present in the same product when prepared in many of the drug stores. Such condemnations are damaging.

Tolstoi uttered a profound truth when he wrote, "Every person to act must consider his or her activity to be important and good. Consequently whatever the position of a man may be, he cannot help but form such a view of human life in general as will make his activity appear important and good."

An analysis of our business shows that we are a combination of the commercial and professional man, with most of our activities stressing the commercial phases of our business, to the neglect of the fundamental basis which differentiates us from other mercantile establishments.

Recently the announcement appeared in the newspapers stating that a certain chain grocery magnate had installed a prescription department in one of his stores. He evidently sees opportunities in the linking up of the professional with the commercial phases of his business. You may rest assured that his interest will not be passive. He will stress this service department of the store, while the independent druggist through his indifference to the professional and his interest in the commercial, loses much of the business which should be his.

A contrast of medicine and pharmacy is interesting. A group of physicians get together and talk about the interesting cases they have had, improved technique in operative procedure, new combinations of drugs they have found effective in alleviating the ills of mankind. They stress the service rendered and endeavor to increase their usefulness to humanity. When pharmacists gather, the gist of the conversation is too often the price at which this or that commodity is sold.

It seems to me what we need in pharmacy is the development of the professional attitude or spirit so that it occupies a place equally as important as the commercial; the adoption as a part of our business policy of an ethical attitude and adherence to a code of ethics; what one writer calls Professionalization. I am quoting at length from E. A. Ross, an authority on sociology, because what he says is pertinent to the subject under consideration.

"The patron of the artisan or tradesman is presumed to be competent to look out for his own interests. Bad wares he can reject, and poor service he can refuse to pay for. But the patron of a calling which involves the use of highly technical knowledge, since he is not qualified to judge the worth of the service he receives, he has to take it on trust. One will hesitate to commit one's dearest interests to such men unless one believes them to be worthy of trust. There is need, therefore, that a calling of this confidential character be restricted to men of honor acting with reference to a high standard. The means of bringing this to pass is to elevate the calling into a profession.

"The expert cannot raise the tone of his calling unless he is shielded from the withering competition of bunglers, quacks and charlatans. So the first step toward the creation of a profession is the exclusion of the unfit. This is sought by forbidding the practice of the profession to all save those who have been licensed by some agency authorized to examine and pass upon the proficiency and character of the applicant. Along with this goes often the power to expel from the profession the practitioner whose conduct is such as to bring it into disrepute.

"It is not enough to bar out unworthy persons. It is necessary that the calling attract to itself men of good breeding and high spirit, for such will contribute most to set and fix an exacting standard of professional conduct. To this end the law generally accords the calling some official recognition.

"The natural effect of fencing the field and attracting into it superior men is the growth of the professional spirit, which is the very antithesis of the commercial spirit. In a true profession the pursuit of gain is subordinate to the aim of service. This implies for one thing that the practitioner will have but one grade of work, namely, his best. The cobbler may patch according to the pay, but no physician will be respected who from carelessness botches a charity case. Again, the practitioner will be loyal to the interests of his patron even to the extent of opposing the patron's wishes. He will quit rather than render what he knows to be a disservice rather than a service. As counselor in the intimate matters of life, the professional man must command the implicit confidence of his patron.

"In consideration of the protection, recognition and rights enjoyed by the professions they generally acknowledge their obligation to practice with due regards to the interests of society. While architects and engineers are at liberty to patent their inventions, the medical profession has always set its face against secret remedies and the patenting of means of relieving human suffering; insisting that it is part of the physicians' honor not to restrict the use of medicine for the purpose of private gain, but to give it freely to the world. The doctors' fight with the makers of proprietary medicine is a war to the knife between the professional and the commercial spirit."

Implicit confidence is one of the prime requisites for success in pharmacy as well as in any of the other professions. A man's integrity, his devotion to truth, his willingness to serve humanity faithfully and honestly, rendering only one grade of work, namely the best, and vending only merchandise of known quality are some of the requisites to obtaining the implicit confidence of one's patrons, and the building up of a professional prestige that commands the confidence of one's fellow men, professional as well as laymen.

It is not necessary that one cease to be a merchandizer in order to increase one's professional reputation. Why not make a hobby of your prescription department? You play golf, tennis and participate in other sports in order to become acquainted with the people who enjoy these sports and incidentally sell them their sporting goods supplies. Cultivate the friendship of physicians, dentists and nurses on a basis of rendering scientific service to your fellow men. Pharmacy offers greater opportunities for this than almost any other profession.

Convey to your customers the information that when a prescription leaves your store it contains drugs of known potency, compounded so as to give the effect the physician wants. When, as is often the case, a person asks for some remedy that you feel it is unwise for him to use except under the physician's guidance, inform him of the fact. You may lose that sale, but the confidence inspired will repay you for it later.

The physicians should be informed that this is part of your business policy. Detail the physician and dentist that they may feel you are interested in their activities, are willing to provide the remedies they need for their part in life's work. Study their peculiarities, likes and dislikes, and cater to them. Serve them as they want to be served, for they, like ourselves, are human beings and respond to favorable service.

Adopt a similar attitude toward all your customers, for after all it is human beings to whom we are selling whether merchandise or service is involved.

In closing, I wish to quote from an article on "Pharmaceutical Education" that appeared in the February number of the *Journal of Chemical Education*, written by W. F. Rudd of the Medical College of Virginia. He says:

"It is evident to even the most optimistic that in spite of the legal restrictions and vastly improved educational opportunities for pharmacy, all the problems that have so seriously beset

it for a century are not yet solved. There are still among us many who see the pharmacist as just another high-powered salesman. *They* must die and *their* places gradually be filled by men devoted to the ideal that the only reason for the existence of the pharmacist at all is the same as that for the physician, dentist or nurse; *i. e.*, that he is a worker in the larger field of public health. We have a long way to go, but there are signs everywhere that we are already on the way."

The training of the professional pharmacist of the next generation and the future leaders of our profession is the task confronting our colleges of pharmacy. That they will meet it, especially if we give them our coöperation, you may rest assured.

USE OF FLUIDEXTRACTS DURING THE PAST 50 YEARS.*

BY E. N. GATHERCOAL.

The following tabulation of data on the use of fluidextracts in prescriptions presents a vivid picture of the decrease in use of this important line of galenicals. This is one of the very striking studies developing out of the U. S. P.-N. F. Prescription Ingredient Survey.

The U. S. P.-N. F. Prescription Ingredient Survey of 1930, which has been in progress for nearly a year, but is now rapidly nearing completion, will present a nation-wide view of the items used in prescriptions in the United States and the number of times each one occurs in ratio to 10,000 prescriptions.

This Survey has been based on the findings of the Prescription Count Survey. The Prescription Count Survey will indicate in a general way that from one-third to one-quarter of the prescriptions filled in drug stores in this country are dispensed by high class prescription type drug stores, or by stores which do a large prescription business. About one-third of the prescriptions are filled in stores of a middle class so far as the prescription trade is concerned, and about one-third in stores in which the prescription trade is relatively small.

We find that in the very large high type prescription stores, that the greatest assortment of prescription items is called for. That is, the actual items called for in a definite number of prescriptions (10,000) will be high. In the second group of stores this list of items in 10,000 prescriptions will be considerably reduced; and in the third group this list of prescription ingredients will be quite markedly reduced. While this reduction is evident in all types of prescription ingredients, it is, perhaps, least marked in the proprietary type, and most marked in the U. S. P. type.

The Survey is centered about four cities, namely, New York, Baltimore, St. Louis and San Francisco, though it spreads quite widely throughout the respective states in which these cities are located.

The Survey in New York State, embracing 40,000 prescriptions, has been completed, and advance has been made in the other cities, though the data is not fully tabulated.

In addition to this new survey work being done over the year 1930, we have tabulated data from six other surveys of similar nature that have been made during the past 50 years. Therefore, we not only have a picture of present-day conditions, but an opportunity to study the trends of medicine over a half century of time.

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* National Formulary Bulletin, February 12, 1932.

In the following tabulation, the column headed "1885" represents a survey prepared by Albert E. Ebert on 15,734 ℞ from nine stores in Chicago and other Illinois cities, and published in the Proceedings of the Illinois Pharmaceutical Association of 1885.

The column headed "1895" represents the data from 12,000 prescriptions in Chicago and other cities of Illinois prepared by C. S. N. Hallberg and published in the Proceedings of the Illinois Pharmaceutical Association of 1895.

The column headed "1908" represents data included in a "Statistical Report on Prescriptions collected by direction of the Board of Trustees of the U. S. Pharmacopœial Convention of 1900 and collated by C. S. N. Hallberg and Clyde Mason Snow from June 1908 to December 1909." This report has never been published. It covers 117,000 prescriptions from 21 states.

The column headed "1927" represents data from the Charters' Report on 17,577 prescriptions, and published in "Basic Material for a Pharmaceutical Curriculum" first edition 1927.

The column headed "1931 New York" represents the data from 40,000 prescriptions read in New York City and other cities of New York State for the U. S. P.-N. F. Prescription Ingredient Survey.

The column headed "1931 Maryland" represents the data from 6000 prescriptions read in Baltimore and other cities of Maryland for the U. S. P.-N. F. Prescription Ingredient Survey.

The column headed "1931 California" represents the data from 8000 prescriptions read in San Francisco and other cities of California for the U. S. P.-N. F. Prescription Ingredient Survey.

	Per 10,000 Prescriptions.						
					1931.		
Fluidextracts.	1885.	1895.	1908.	1927.	N. Y.	Md.	Cal.
Used 25 times or more	20	9	4	5	3	3	0
Used 10 to 24 times	25	20	10	0	2	1	1
Used 2 to 9 times	41	56	74	41	21	9	8
Used once or less	13	8	35	24	28	1	5
Total U. S. P. and N. F.	99	93	123	79	54	14	14
U. S. P. and N. F. not used	84	90	60	113	129	169	169
Total	183	183	183	183	183	183	183
Unofficial ones used	25	26	22	16	5	2	1

The following list of fluidextracts represents those which occur 10 or more times in each 10,000 prescriptions in the tabulation above:

	Per 10,000 Prescriptions.						
					1931.		
Fluidextracts.	1885.	1895.	1908.	1927.	N. Y.	Md.	Cal.
Aconite	21		10				
Apocynum		12					
Aurant. Amara	11						
Belladonna Radix	37	33	16				
Buchu		66	22				
Buchu Comp.	190						
Calumba	24	19					
Cannabis		12					
Cascara Sagrada	100	56	82	77	48	45	
Cascara Sagrada Arom.			59	84	92	71	16

Fluidextracts.	Per 10,000 Prescriptions. 1885.	1895.	1908.	1927.	N. Y.	1931. Md.	Cal.
Castanea		28					
Cimicifuga	27	15					
Cinchona	29	16					
Coca		26					
Colchicum Seed	12						
Condurango						10	
Coto		10					
Cubeb			11				
Digitalis	14	19					
Ergot	239	108	47	66	54		
Eriodictyon	14						
Eucalyptus	10						
Frangula		13					
Gelsemium	53	17					
Gentian	24	22	10				
Geranium	19						
Glycyrrhiza	82	52	27	42	17		
Gossyp. Cort.	13	12					
Grindelia			10		37		
Hamam. Folia	17						
Humulus	16						
Hydrastis	86	24	23	28			
Hyoscyamus	44	18	16				
Ipecac		28	12				
Juniper	37						
Kava	10						
Lappa	18						
Leptandra	14						
Nux Vomica	20	16					
Pareira	10						
Phytolacca		20					
Podophyllum	39	10					
Prunus Virg.	54						
Rhubarb	42						
Rumex	34						
Sarsaparilla	24						
Sarsaparilla Comp.	19						
Scilla	12	22					
Scoparius	11						
Senega					10		
Senna	88						
Stillingia	15						
Taraxacum	86	28	18				
Triticum		12					
Uva Ursa	48	13					
Valerian	27						
Viburnum Prunif.	21						
Xanthoxylum	11						
Zea	10	14					
Zingiber	21						

THE U. S. P.-N. F. PRESCRIPTION INGREDIENT SURVEY OF 1931.

PRELIMINARY REPORT ON THE USE OF U. S. P. ITEMS IN NEW YORK STATE.

The object of this Survey is to obtain authentic information as to the names of the ingredients ordered in prescriptions, and the number of times that each ingredient is used in a definite number of prescriptions. Such information obtained in sufficiently large samples and from a sufficient number of different places in the United States should give a very fair picture of the prescription ingredients and their usage or occurrences in the United States.

The information regarding prescription ingredients and their frequency of occurrence in prescriptions compounded in drug stores in the United States will be of real value to the Subcommittee on Scope of the U. S. Pharmacopœia and to the National Formulary Revision Committee.

It is recognized that a prescription pharmacy well located in the center of a large city, and filling from 30,000 to 150,000 prescriptions annually, will yield a very comprehensive list of items used in prescriptions. From indications given by data already in hand, about one third of the total prescriptions compounded in the United States are filled in stores and hospital pharmacies in which the preparation of medicines and the compounding of prescriptions is the principal business of the pharmacy, and in which the number of prescriptions filled annually is relatively large.

Another third of the prescriptions is filled in stores in which the average annual number of prescriptions compounded is well above 5000; and the final third is compounded in the smaller type of stores in which the average annual number of prescriptions filled is considerably below 5000. Therefore, to obtain a true picture, not only of the names of the ingredients but of the number of occurrences of each in the prescriptions of the United States, it is necessary to obtain the "sample" in each locality along these lines.

Based on the data mentioned above, 10,000 prescriptions were read in a large prescription store in New York City, a second 10,000 were read in five New York City stores having a high-grade prescription business, a third 10,000 were read in the medium and smaller type of stores in Buffalo and a fourth 10,000 in stores doing a small prescription business (sometimes less than 1000 annually) in smaller towns of New York State. These groups of 10,000 prescriptions each are presented in Columns I, II, III and IV, respectively.

The fourth lot of 10,000 prescriptions from small stores in New York State is included to insure a very full representation of this type of drug stores in the Survey.

The Collection of the Prescription Data.—In New York City the prescriptions were all read by Mr. Harry Harris, a prescription pharmacist, under the direct supervision of J. Leon Lascoff. In Buffalo and New York State the prescriptions were read by Professor Leon Monell or under his direct supervision. By engaging trained prescription men to give their full attention to the work much more accurate and uniform results were obtained than if the work had been left to individual pharmacists, busy in their stores and unfamiliar with the methods of the Survey.

The names of the ingredients and the number of occurrences in each block of 500 prescriptions were entered upon a specially devised form. The prescriptions

were all originals, were properly distributed throughout the year in each store and included the proper proportion of narcotic prescriptions, but no prescriptions from the liquor prescription file.

As these reports were received in the office of Chairman Gathercoal, the information was transferred to large tabulation forms, upon the pages of which all of the titles of U. S. P. VIII, IX and X, and N. F. III, IV and V were printed in alphabetical arrangement with numerous cross references. Non-official and Proprietary items were listed on blank sheets, which were incorporated with the printed sheets. On this form the data from 30 blocks of 500 prescriptions each can be entered. Similar data, but from a somewhat smaller number of prescriptions have been received from California (San Francisco) and from Maryland (Baltimore) and Missouri (St. Louis). The total number of prescriptions entering into this Survey will exceed 120,000 and the selection of these prescriptions is based upon the most approved method.

Comparison with Other Surveys.—To give added value to the U. S. P.-N. F. Prescription Ingredient Survey, a comparison with six other earlier surveys has been made. These earlier surveys begin with one made by Albert Ebert in 1885 and extend to the survey made by Chairman E. Fullerton Cook in 1929–1930. These surveys will be arranged in parallel columns and thus a sweeping view of the prescription ingredients of the last fifty years will be made available.

Preparation of the Reports.—The total number of Official items in the New York State portion of the Survey is 781, and the number of Unofficial and Proprietary items is 2017, or a total of 2798 different items from 40,000 prescriptions. When the returns from the other three states are completed, the total number of items actually encountered in the Survey and entered in the report will approach 3500. This enormous number of items, with the figures from seven distinct surveys will constitute a very large volume of statistical information. Such a mass of statistics will be of relatively little interest to the great majority of pharmacists and medical men. Therefore, it becomes necessary to break down this information into a considerable number of separate reports dealing more specifically with certain phases of the information.

This report from New York State is designed to give an early view of the items used in prescriptions and should prove of real interest to many pharmacists in New York State as well as in all sections of the country.

INGREDIENTS OCCURRING IN PRESCRIPTIONS IN NEW YORK STATE.

COLUMN I.

10,000 prescriptions from J. Leon Lascoff's Prescription Pharmacy, New York City.

	Ingredients.		Occurrences.	
	No. of.	Per cent of.	No. of.	Per cent of.
Official in U. S. P. X.....	409	25.86	15,544	64.52
Official in N. F. V.....	163	10.33	2,385	9.90
Other Items*.....	1006	63.81	6,160	25.58
Total.....	1578	100.00	24,089	100.00

Each prescription averages 2.4 ingredients.

There are 621 monographs of drugs, chemicals and preparations in the U. S. P. X; as 409 of these are represented in this report, it indicates that 65.7 per cent of the total U. S. P. X items are used in these 10,000 prescriptions.

Of the 758 monographs of drugs, chemicals and preparations in the N. F. V, 163 appear in Column I; this is 21.4 per cent of the total.

COLUMN II.

10,000 prescriptions from five moderate-sized drug stores in New York City.

	Ingredients.		Occurrences.	
	No. of.	Per cent of.	No. of.	Per cent of.
Official in U. S. P. X.....	423	26.86	18,116	70.21
Official in N. F. V.....	194	12.32	2,390	9.26
Other Items*.....	958	60.82	5,296	20.53
Total.....	1575	100.00	25,802	100.00

Each prescription averages 2.6 ingredients.

*See note on page 280—A Note on "Other Items."

Of the total number of items in the
U. S. P. X.....68.12 per cent appear in Column II.
N. F. V.....25.80 per cent appear in Column II.

COLUMN III.

10,000 prescriptions from ten smaller drug stores in Buffalo, New York.

	Ingredients.		Occurrences.	
	No. of.	Per cent of.	No. of.	Per cent of.
Official in U. S. P. X.....	349	26.78	9,859	54.79
Official in N. F. V.....	126	9.67	1,601	8.90
Other Items*.....	828	63.55	6,534	36.31
Total.....	1303	100.00	17,994	100.00

Each prescription averages 1.8 ingredients.

Of the total number of items in the
U. S. P. X....56.2 per cent appear in Column III.
N. F. V.....16.6 per cent appear in Column III.

COLUMN IV.

10,000 prescriptions from eleven smaller drug stores in various towns in New York State.

	Ingredients.		Occurrences.	
	No. of.	Per cent of.	No. of.	Per cent of.
Official in U. S. P. X.....	351	28.49	8,951	53.57
Official in N. F. V.....	127	10.31	1,418	8.49
Other Items*.....	754	61.20	6,336	37.94
Total.....	1232	100.00	16,705	100.00

Each prescription averages 1.7 ingredients.

* See note on page 280—A Note on "Other Items."

Of the total number of items in the
U. S. P. X....56.5 per cent appear in Column IV.
N. F. V.....16.8 per cent appear in Column IV.

SUMMARIES.

Ingredients from.	I.	II.	III.	IV.
U. S. P. X.....	409	423	349	351
N. F. V.....	163	194	126	127
Other Items*.....	1,006	958	828	754
Total.....	1,579	1,575	1,303	1,232
Occurrences from.	**I.**	**II.**	**III.**	**IV.**
U. S. P. X.....	15,544	18,116	9,859	8,951
N. F. V.....	2,385	2,390	1,601	1,418
Other Items*.....	6,160	5,296	6,534	6,336
Total.....	24,089	25,802	17,994	16,705

Average Number of Ingredients per Prescription.

I.	II.	III.	IV.
2.4	2.6	1.8	1.7

Percentage Used of.	I.	II.	III.	IV.
U. S. P. X Items	65.7	68.12	56.2	56.5
N. F. V Items	21.4	25.8	16.6	16.8
N. F. V, Part I, Items	25.4	30.4	21.2	21.2

Total number of items found in the 40,000 prescriptions in New York State:

508 U. S. P. X items out of a total of 621 U. S. P. X items
273 N. F. V items out of a total of 758 N. F. V items
2017 Other Items*

2798 Total

* See note below—A Note on "Other Items."

A NOTE ON "OTHER ITEMS."

While definite rules for the determination of proprietary items have been presented by the Commission on Proprietary Medicines, yet we have not attempted to separate the items designated here as "Other Items" into "Unofficial Items" and "Proprietary Items." If we designate the U. S. P. and N. F. Items, the undesignated items can be classified by each reader as he thinks best.

However, the value of these items in the Survey is relatively small. Of the 2017 items in this group in the New York portion of the Survey, representing 40,000 prescriptions, 787 items occur but once, 797 occur from 2 to 9 times and only 433 occur more than 10 times. The 1584 items in this group that occur less than 10 times each, have a total of occurrences in the 40,000 prescriptions of 3944 times, while the three leading U. S. P. items, namely Codeine Sulphate, Sodium Bicarbonate and Tincture of Nux Vomica, have total occurrences in the 40,000 prescriptions of 4484 times.

The proportion of items that are unquestionably "Unofficial" in the group of "Other Items" is relatively high. This large number of Unofficial items is due especially to many tablets of official drugs. In every case where a tablet was specified in the prescription, it was entered on the reports as a tablet and these are counted as "Unofficial," except for the few official ones. Also in a few instances where a drug or chemical (proprietary) occurs on the market only in tablet form, it was entered in the data as tablet even if the word "tablet" was not specified in the prescription.

The same rule holds true for all ampuls, pills, enteric-coated pills and some other minor forms of pharmaceutical preparations especially of proprietary nature.

However, a somewhat different procedure was followed with percentage solutions and capsules. Both of these pharmaceutical preparations are being increasingly produced by manufacturers and marketed, frequently, under proprietary names. Yet the prescription pharmacist has but little trouble or work in making these at the prescription counter and when the solutions or capsules can be prepared from common drugs or chemicals, the prescriptionist usually does so prepare them. Therefore, in cases where solutions or capsules were specified, and the preparation is not listed by a manufacturer or a proprietor, the items of the solution or capsule

were entered separately in our tabulations and not under the name of capsules or solution. Instances of this type may be cited as follows: Sol. Argyrol, 10% was entered as Water and Argyrol; Capsules Acid Acetylsalicylic, 5 gr. were entered under the Acid.

NUMERICAL RANK AND OCCURRENCES OF THE ITEMS IN THE NEW YORK STATE PORTION OF THE SURVEY.

The following list shows all of the items in the New York State portion of the Survey according to the numerical rank. The number after each item indicates the occurrences per 10,000 prescriptions. The items are listed by name as far down as those occurring 10 times per 10,000 prescriptions. Those occurring a fewer number of times than this are grouped without being named.

1.	Aqua Destillatæ U. S. P.	680.75	42.	Liq. Potassii Arsenitis U. S. P.	101.00
2.	Codeinæ Sulphas U. S. P.	487.50	43.	Codeina U. S. P.	100.00
3.	Sodii Bicarbonas U. S. P.	337.00	44.	Zinci Sulphas U. S. P.	100.00
4.	Tinctura Nucis Vomicæ U. S. P.	296.50	45.	Quininæ Sulphas U. S. P.	99.75
5.	Acidum Acetylsalicyl. U. S. P.	283.25	46.	Adeps Lanæ Hydrosus U. S. P.	97.75
6.	Glycerinum U. S. P.	274.00	47.	Morphinæ Sulphas U. S. P.	96.25
7.	Elix. Pepsini Comp. N. F.	251.50	48.	Phenolphthaleinum U. S. P.	94.75
8.	Sodii Bromidum U. S. P.	243.50	49.	Tablets Luminal	92.75
9.	Tinctura Belladonnæ U. S. P.	226.25	50.	Fldxt. Casc. Sagr. Aro. U. S. P.	92.50
10.	Sodii Salicylas U. S. P.	224.50	51.	Lactosum U. S. P.	90.50
11.	Acetphenetidinum U. S. P.	215.00	52.	Magnesii Oxidum U. S. P.	86.25
12.	Ammonii Chloridum U. S. P.	202.50	53.	Liquor Epinephrinæ HCl. U. S. P.	85.00
13.	Tinctura Digitalis U. S. P.	185.25	54.	Tr. Gentianæ Comp. U. S. P.	83.00
14.	Phenol U. S. P.	175.25	55.	Cerii Oxalas	82.25
15.	Elixir Luminal	173.00	56.	Syrupus U. S. P.	82.00
16.	Tinctura Opii Camph. U. S. P.	161.75	57.	Ephedrine Inhalant	79.25
17.	Bismuthi Subnitras U. S. P.	159.75	58.	Sedatole	79.25
18.	Phenobarbitalum U. S. P.	156.75	59.	Alcohol U. S. P.	78.00
19.	Menthol U. S. P.	140.50	60.	Antipyrina U. S. P.	77.75
20.	Mist. Rhei Comp. N. F.	138.75	61.	Atropinæ Sulphas U. S. P.	76.25
21.	Amidopyrina U. S. P.	138.25	62.	Aqua Menthæ Pip. U. S. P.	76.00
22.	Caffeina Citrata U. S. P.	137.50	63.	Mist. Glycyrrh. Comp. U. S. P.	76.00
23.	Potassii Iodidum U. S. P.	136.00	64.	Thyroideum Siccum U. S. P.	75.00
24.	Tinctura Hyoscyami U. S. P.	133.50	65.	Chloralis Hydras U. S. P.	74.00
25.	Zinci Oxidum U. S. P.	133.50	66.	Petrolatum Liquidum U. S. P.	72.75
26.	Bismuthi Subcarbonas U. S. P.	130.25	67.	Elix. Terpini Hydratis N. F.	72.50
27.	Morphinæ Sulphate	129.75	68.	Petrolatum U. S. P.	70.75
28.	Syrupus Tolu U. S. P.	129.00	69.	Elix. Brom. Trium N. F.	70.50
29.	Potassii Citras U. S. P.	128.00	70.	Camphora U. S. P.	68.25
30.	Strychninæ Sulphas U. S. P.	125.75	71.	Ungt. Aqua Rosæ U. S. P.	68.25
31.	Phenylis Salicylas U. S. P.	123.25	72.	Strontii Bromidum	68.00
32.	Acidum Boricum U. S. P.	121.25	73.	Tabs. Allonal	67.25
33.	Acidum Salicylicum U. S. P.	119.75	74.	Methylis Salicylas U. S. P.	65.75
34.	Elixir Peptenzyme	117.50	75.	Spt. Ammon. Anisat. N. F.	64.75
35.	Elixir Lactopeptine	116.75	76.	Codeinæ Phosphas. U. S. P.	63.75
36.	Syrup Cocillana Comp.	111.00	77.	Ungt. Hydrargyri Amm. U. S. P.	63.50
37.	Syr. Pruni Virginianæ U. S. P.	108.50	78.	Citrocarbonate	62.25
38.	Tabs. Codeine Sulph.	106.50	79.	Methenamina U. S. P.	61.50
39.	Extractum Belladonnæ U. S. P.	103.75	80.	Syr. Ipecacuanhæ U. S. P.	61.25
40.	Argento-Proteinum Mite U. S. P.	103.25	81.	Calamina Preparata N. F.	60.00
41.	Neo Silvol	101.50	82.	Syrup Thiocol	58.75

83.	Elix. Glycerophos. Co. N. F.	58.50	138.	Tabs. Empirin Comp.	33.00
84.	Neurophosphates	58.50	139.	Liq. Amm. Acetatis U. S. P.	32.75
85.	Sp. Aethylis Nitrit. U. S. P.	58.25	140.	Hydrarg. Ammoniatum U. S. P.	32.50
86.	Tabs. Strych. Sulph.	58.00	141.	Chlorodyne	32.00
87.	Elix. Peps. et Rennin. Co. N. F.	57.00	142.	Pepsinum U. S. P.	32.00
88.	Elix. Aromaticum U. S. P.	55.50	143.	Tr. Valerianæ U. S. P.	31.75
89.	Potassii Bromidum U. S. P.	55.50	144.	Cherocol	31.00
90.	Cascara Evacuant	54.75	145.	Rheum U. S. P.	30.25
91.	Cocainæ Hydrochlor. U. S. P.	54.75	146.	Liq. Calamina N. F.	30.00
92.	Tinctura Aconiti U. S. P.	54.75	147.	Taka Diastase Liquid	30.00
93.	Liq. Pot. Iod. N. F.	54.50	148.	Ephedrol	29.75
94.	Fldxt. Ergotæ U. S. P.	54.25	149.	Acid. Hydrocyanicum Dil.	29.50
95.	Pulv. Ipecac. et Opii U. S. P.	53.50	150.	Bi-So-Dol	29.25
96.	Acid. Hydrochl. Dil. U. S. P.	52.50	151.	Sol. Hexylresorcinol	29.00
97.	Potassii Acetas U. S. P.	52.50	152.	Potassii Bicarbonas U. S. P.	28.00
98.	Hydrarg Chlor. Mit. U. S. P.	52.25	153.	Camphora Monobromata	27.75
99.	Oleum Menthæ Pip. U. S. P.	51.00	154.	Pituitarium U. S. P.	27.75
100.	Liq. Calcii Hydrox. U. S. P.	50.25	155.	Ungt. Zinci Oxidi U. S. P.	27.75
101.	Tinctura Opii U. S. P.	50.25	156.	Ungt. Hydrarg. Oxidi U. S. P.	27.50
102.	Mag. Oxid Pond. U. S. P.	50.00	157.	Arsenoferratose	27.25
103.	Magnesii Carbonas U. S. P.	48.00	158.	Liq. Amm. Acetatis N. F.	27.00
104.	Aqua Rosæ U. S. P.	47.75	159.	Oleum Eucalypti U. S. P.	27.00
105.	Arseni Trioxidum U. S. P.	47.75	160.	Oleum Pulveratum U. S. P.	27.00
106.	Magma Magnesiæ U. S. P.	47.75	161.	Elix. Terp. Hyd. et Cod. N. F.	26.75
107.	Fldxt. Casc. Sagr. U. S. P.	47.50	162.	Syr. Ferri Iodidi U. S. P.	26.25
108.	Petrolatum Album U. S. P.	47.50	163.	Sodii Phosphas U. S. P.	26.00
109.	Oleum Theobromatis U. S. P.	47.25	164.	Potassii Chloras U. S. P.	25.75
110.	Syrupus Aurantii U. S. P.	47.25	165.	Syr. Hypophos. Co. N. F.	25.25
111.	Syr. Sarsap. Comp. U. S. P.	46.75	166.	Viosterol	25.25
112.	Ovarian Substance and Residue	46.00	167.	Iodex Methyl Salicyl.	24.75
113.	Sulphur Præcipitat. U. S. P.	45.75	168.	Syr. Acidi Hydriodici U. S. P.	24.75
114.	Elix. Ferri, Quin. et Strych. N. F.	45.50	169.	Syr. Rubi Idæi N. F.	24.75
115.	Æthylmorph. Hydrochl. U. S. P.	45.00	170.	Nitroglycerine	24.25
116.	Resorcinol U. S. P.	45.00	171.	Tabs. Amytal	24.00
117.	Metatone	43.75	172.	Pantopon	23.75
118.	Syrupus Scillæ U. S. P.	42.25	173.	Tabs. Nitroglycerine	23.75
119.	Magma Bismuthi N. F.	42.00	174.	Iodex	23.50
120.	Neurosine	42.00	175.	Syr. Scillæ Comp. U. S. P.	23.50
121.	Sodii Boras U. S. P.	42.00	176.	Oleum Morrhuæ U. S. P.	23.25
122.	Tinctura Benzoini Comp. U. S. P.	42.00	177.	Oleum Ricini U. S. P.	23.00
123.	Liq. Acidi Borici	41.25	178.	Liq. Ferri Pept. et Man. N. F.	22.75
124.	Prescriptions by Special No.	41.25	179.	Sucrosum U. S. P.	22.75
125.	Oleum Olivæ U. S. P.	40.75	180.	Tabs. Urotropin	22.25
126.	Tabs. Pantopon	38.75	181.	Cheracol and Codeine	22.50
127.	Tr. Bryonia N. F.	37.75	182.	Liq. Sod. Bor. Co. N. F.	22.50
128.	Tr. Ferri Chloridi U. S. P.	37.75	183.	Chloretone Inhalant	22.25
129.	Mist. Pectoralis N. F.	37.50	184.	Suxiphen	22.00
130.	Sp. Amm. Aromaticus U. S. P.	37.50	185.	Tabs. Pyramidon	22.00
131.	Elix. Alurate	36.25	186.	Sol. Ephedrine Sulph.	21.75
132.	Tabs. Thyroid	35.25	187.	Tr. Ipecac. N. F.	21.25
133.	Tabs. Tolysin	34.75	188.	Cerose	21.00
134.	Tr. Sanguinariæ N. F.	34.75	189.	Pasta Zinci N. F.	21.00
135.	Theobromin. Sodio-Salicyl. U. S. P.	34.25	190.	Tinctura Iodi U. S. P.	21.00
			191.	Tabs. Caroid and Bile Salts	20.75
136.	Sodii Iodidum U. S. P.	34.00	192.	Tabs. Cinchophen	20.50
137.	Caripeptic Liquid	33.00	193.	Citronin	20.25

194.	Syr. Euphorbiæ Co. N. F.	19.75	249.	Potassii Permanganas U. S. P.	14.50
195.	Ext. Aloes	19.50	250.	Terpini Hydras U. S. P.	14.25
196.	Calcii Glycerophos. U. S. P.	19.25	251.	Mist. Helonin Comp.	14.00
197.	Ext. Opii N. F.	19.25	252.	Caps. Caffeine Comp.	13.75
198.	Sodii Citras U. S. P.	19.25	253.	Pepto-Bismol	13.75
199.	Tr. Benzoini U. S. P.	19.25	254.	Sp. Glyceryl. Nitrat. U. S. P	13.75
200.	Hemaboloids Arsen. with Strych.	18.75	255.	Tabs. Triple Bromides	13.75
201.	Luminal-Sodium	18.75	256.	Sanmetto	13.50
202.	Tabs. Nephritin	18.75	257.	Tr. Lobeliæ U. S. P.	13.50
203.	Tabs. Peralga	18.75	258.	Aq. Hamamelidis N. F.	13.25
204.	Caps. Ephredine Sulph.	18.50	259.	Caps. Oxyl Iodide Comp.	13.25
205.	Ferrum Reductum U. S. P.	18.50	260.	Liniment. Saponis U. S. P.	13.25
206.	Taka Diastase	18.25	261.	Liquid Digifoline	13.25
207.	Tr. Cannabis	18.25	262.	Liquor Iodi Comp. U. S. P.	13.25
208.	Vitamexol	18.25	263.	Tabs. Atophan	13.00
209.	Tabs. Morph. et Atropine Sulph.	18.00	264.	Massa Ferri Carb. U. S. P.	13.00
210.	Vin. Colch. Sem.	18.00	265.	Anthrarobin	12.75
211.	Sodii Chloridum U. S. P.	17.75	266.	Incretone	12.75
212.	Tabs. Ovar. Subs. et Residue	17.75	267.	Sol. Ephedrine Hydrochlor.	12.75
213.	Tr. Cinchonæ Comp. U. S. P.	17.75	268.	Sol. Mercurochrome	12.75
214.	Caps. Amytal Comp.	17.50	269.	Cignolin	12.50
215.	Elix. Lascatone Comp.	17.50	270.	Elix. Chloro Calc.	12.50
216.	Gray's Glycerin Tonic Co.	17.50	271.	Thymol U. S. P.	12.50
217.	Syr. Acidi Citrici U. S. P.	17.50	272.	Ungt. Belladonnæ U. S. P.	12.50
218.	Salicionyl	17.25	273.	Hayden's Viburnum Comp.	12.25
219.	Caps. Ergo Apiol	17.00	274.	Elix. Cinchona Alk. N. F.	12.25
220.	Adrenalin Chloride Inhalant	16.75	275.	Ext. Ergotæ Aquosum N. F.	12.25
221.	Extract. Cascara Sagr. U. S. P.	16.75	276.	Infusum Digitalis U. S. P.	12.25
222.	Sp. Chloroformi U. S. P.	16.75	277.	Tabs. Calcidin	12.25
223.	Syr. Ipecac et Opii N. F.	16.75	278.	Tr. Cardamomi Comp. U. S. P.	12.25
224.	Fldxt. Glycyrrhizæ U. S. P.	16.50	279.	Tr. Strophanthi U. S. P.	12.25
225.	Sp. Menthæ Pip. U. S. P.	16.50	280.	Liq. Picis Carbonis N. F.	12.00
226.	Iodum U. S. P.	16.25	281.	Lot. Plumbi et Opii N. F.	12.00
227.	Liniment. Chlorof. U. S. P.	16.25	282.	Pascarnata	12.00
228.	Tabs. Hormotone	16.25	283.	Tr. Stramonii U. S. P.	12.00
229.	Tabs. Sod. Salicyl. Eff.	16.25	284.	Mistura Cretæ U. S. P.	11.75
230.	Tragacantha U. S. P.	16.25	285.	Tabs. Atropine Sulph.	11.75
231.	Elix. Brom. et Belladonna. Co.	16.00	286.	Mucilago Acaciæ U. S. P.	11.75
232.	Tr. Persionis N. F.	16.00	287.	Sodii Biphosphas U. S. P.	11.75
233.	Tabs. Codeine Phos.	15.75	288.	Sodii Nitris U. S. P.	11.75
234.	Digifortis	15.50	289.	Magnesii Sulphas U. S. P.	11.50
235.	Ephedrine Sulphate	15.50	290.	Pancreatinum U. S. P.	11.50
236.	Tabs. Ovarium	15.50	291.	Ungt. Acidi Borici U. S. P.	11.25
237.	Tr. Lavand. Comp. U. S. P.	15.50	292.	Creosotum U. S. P.	11.00
238.	Compound Ephedrine Inhalant	15.25	293.	Elix. Gent. Glycer. N. F.	11.00
239.	Neocinchophen	15.25	294.	Tabs. Medinal	11.00
240.	Sodii Benzoas U. S. P.	15.25	295.	Tolysin	11.00
241.	Syr. Amm. Hypophos. N. F.	15.25	296.	Urolithia	11.00
242.	Caprokol	15.00	297.	Adrephine	10.75
243.	Elix. Ferri Quin. et Strych. Phos.	15.00	298.	Creta Præparata U. S. P.	10.75
244.	Phospho-Soda	15.00	299.	Eucalyptol U. S. P.	10.75
244*a*.	Tr. Capsicum U. S. P.	14.75	300.	Tabs. Blaud Comp.	10.75
245.	Agarol	14.75	301.	Ungt. Kerolysin	10.75
246.	Liquor Sedans	14.75	302.	Caps. Farastan	10.50
247.	Sod. Glycerophosphas. N. F.	14.75	303.	Digalen	10.50
248.	Tr. Zingiberis U. S. P.	14.75	304.	Ergatole	10.50

305.	Petrolagar and Phenolphth.	10.50	311.	Lactopeptine	10.00
306.	Suprarenal Substance and Ext.	10.50	312.	Oleum Cinnamomi U. S. P.	10.00
307.	Tumenol	10.50	313.	Oleum Santali U. S. P.	10.00
308.	Ungt. Sulphuris U. S. P.	10.50	314.	Syrupus Senegæ U. S. P.	10.00
309.	Balm Analgesique Bengue	10.25	315.	Syr. Tolu and Codeine Comp.	10.00
310.	Ol. Amygdalæ Exp. U. S. P.	10.25			

A NOTE ON SYNONYMS AND PROPRIETARIES.

The original instructions to the prescription readers included a statement to the effect that duplications should be avoided as much as possible, and no instructions were given (an unfortunate omission perhaps) to carefully preserve the data on synonyms. In a number of instances the reader also has not carefully preserved the distinction between official items and proprietary trade names which are synonyms for these items.

Sometimes it is very difficult to determine how an item written in a prescription is to be classified. For instance Elix. Lact. Pep. is of very common occurrence; is it to be translated Elixir Lactated Pepsin or Elixir Lactopeptine? Another interesting item is Elix. Lactopepsin; is this Elixir Lactated Pepsin or Elixir Lactopeptine? Again, is Aspirin to be listed as Acid Acetylsalicylic or not? It is widely manufactured by many firms and usually the synonym "Acetylsalicylic Acid" accompanies the name "Aspirin."

Therefore, in the list of items in this report, it has been the practice to include all synonyms under the official title, including proprietary trade names where the proprietary article is acknowledged to be synonymous with the official item.

ACKNOWLEDGMENTS.

The U. S. P.-N. F. Prescription Ingredient Survey involves an enormous amount of work. The joint appropriation made for the expense of the Survey is relatively small. If it were not for the splendid coöperation and gratuitous service of a number of splendid helpers it would not be possible to complete this work.

In connection with the New York Section of the Survey, especial acknowledgment should be made for the help of J. Leon Lascoff in New York City and of Prof. Leon Monell in Buffalo. Each of these men supervised the reading of 20,000 prescriptions. Mr. Harry Harris in New York City and a number of students in the Buffalo College of Pharmacy were engaged to carry on the actual reading work, though Prof. Monell himself did much of this in Buffalo. It takes from 8 to 10 hours to read 1000 prescriptions and enter the data on the first form.

The transfer of the data in the office of Chairman Gathercoal and its tabulation requires at least as much more time. Mr. Gerston Bruch, instructor in the University of Illinois School of Pharmacy, has handled much of this work. The important items of the U. S. P. and N. F. and the major proprietary items are not so difficult, but the thousands of unofficial and minor proprietary items add enormously to this work.

The New Jersey House has passed a bill (A 224) to prohibit the use of the term "pharmacy" or drug store by establishments other than those supervised by a registered pharmacist.

COMMITTEE REPORTS

REPORT OF THE NEW JERSEY COMMITTEE ON PHARMACEUTICAL EDUCATION AND STANDARDS.*

BY ROBERT P. FISCHELIS, *Chairman.*

Educational activities tending to promote the progress of Pharmacy and incidentally the welfare of the pharmacist, appear to be necessary along three distinct lines. *First*, there is the problem of educating the pharmacist in the technical phases of his services to the community. *Secondly*, there is the problem of educating other professions having to do with medical care, to the point of utilizing the services of the pharmacist to the fullest capacity and finally there is the problem of educating the public to appreciate what constitutes proper pharmaceutical service and how far the pharmacist is permitted to go in supplying services relating to medical care.

The problem of educating pharmacists to the point of meeting legal qualifications to practice may be considered the primary phase of pharmaceutical education. It is fairly well organized and rests in the hands of the colleges of pharmacy and the preceptors in our pharmacies who undertake to guide the practical experience of the prospective pharmacist. Although this primary phase of pharmaceutical education looms large in the life of the undergraduate and frequently occupies the spotlight of pharmaceutical education to the exclusion of all other educational activity in the profession, it is only a part of the pharmaceutical educational process.

Some one has said that a license to practice any profession, issued by the State, is not necessarily a guarantee of expert professional service. It is at best merely a guarantee against gross ignorance and incompetence of the licensee and at times it is not even that, for all of us can point to glaring examples of incompetence and ignorance on the part of duly licensed physicians, dentists, pharmacists and others. As far as the professions are concerned, it is plain that although all licensed practitioners are equal in the eyes of the law they are far from being equal in education, technical ability or professional competence. They never will be equal in ability and skill but it is within their power to become sufficiently expert to guarantee efficient and effective service to the public.

No profession can afford to ignore the responsibility of improving the service rendered by its individual members and one of the first steps in assuming that responsibility is to provide ways and means for keeping its members abreast of advances in the sciences and arts which constitute the background of the professions. Medicine and Dentistry have long ago assumed that responsibility. Pharmacy cannot afford to ignore it much longer.

The New Jersey Pharmaceutical Association took cognizance of this situation last June when it instructed this Committee "to make a study of possible methods of keeping the pharmacists of New Jersey abreast of the advances in the sciences underlying the practice of pharmacy and in the art of pharmacy itself and to report at the winter meeting."

After considerable inquiry and study of the activities of the medical profession in this direction, it appears that perhaps the best plan for us to follow is that of the Medical Society of the State of New Jersey, which has for several years been conducting postgraduate lecture courses in coöperation with the Extension Division of Rutgers University. Under this arrangement prominent specialists in selected fields of clinical medicine are brought to various centers throughout the State where the doctors of the particular County or section gather once a week for eight weeks to listen to lectures and to discuss the subject presented. Upon the completion of the course, a certificate is issued which has university credit value.

We believe that an educational activity modeled along this line and worked out by this Committee in coöperation with the Extension Division of Rutgers University would appeal to a sufficient number of our members to warrant its inauguration. At this time we would merely ask that the Committee be authorized to enter into negotiations with the Extension Division of Rutgers University for the purpose of evolving a concrete plan to be submitted to the Association for final action.

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*Presented at the mid-winter meeting of the New Jersey Pharmaceutical Association at Camden, N. J., January 26, 1932.

The problem of educating other professions—principally the medical profession—to the point of utilizing the services of the pharmacist to the fullest capacity will be made less difficult as we increase the activity to keep ourselves abreast of the progress of the times.

There is a great gulf between the viewpoint of the pharmacist whose education centers around drugs and the modern physician whose education centers around the causes of and remedies for diseases. To the narrowly educated pharmacist drugs are everything. To the broadly educated physician drugs are only one means to an end—and by no means the most important one. It is well that we should be experts in the selection, manufacture, compounding and dispensing of drugs and medicines but let us not fail to recognize the development of modern medical science and let us not fail to grasp opportunities for service to the medical profession in which our expert knowledge of drugs may prove to play a minor part. We cannot grasp these opportunities if we do not know what and where they are. We can only learn of their existence through careful study of what physicians are thinking and doing. A few pharmacists have maintained this close contact with the medical profession and they have profited in prestige as well as financially. It is not reasonable to expect that every pharmacist could do the same thing but it is certain that more can do so. To those who wish to try the opportunity should be made available and in the end the entire profession will profit because modern physicians will come to learn that the modern pharmacist has kept pace with developments in medical science to a much greater degree than the physician has realized.

This Committee expects to submit some suggestions at the annual convention along the line of maintaining contact with medical and dental groups for the purpose of acquainting these groups with the abilities, aspirations and services of pharmacists.

The problem of educating the public as to what constitutes proper pharmaceutical service has come to be a highly competitive business. We are slowly being killed with a brand of kindness that is as subtle as it is pernicious. The same melodious voice of the radio announcer which urges mother to wash baby's toys at least once a day with the antiseptic solution that stops colds when it is gargled and cures athlete's foot when it is daubed between the toes, also urges her to buy this antiseptic at the neighborhood drug store.

The manufacturer of Aspirin who warns the public in bold type that all other makes of Aspirin are counterfeits also urges the public to buy it at the neighborhood drug store.

Many other manufacturers emphasize that their wares may be obtained at "all good drug stores" and some even go so far as to say that the product, of secret composition, is "endorsed by all good druggists."

If the pharmacist advises his customer according to the dictates of his conscience and in harmony with his education and professional relations he must, of course, deny many of the extravagant statements and half-truths of these "benefactors" of the retail druggist.

There are other manufacturers who are not so solicitous about our welfare. For instance, one manufacturer of a cough syrup who advertises that his product "contains no dope" words his announcement in such a manner as to cast reflections on all other cough syrups yet he says not one word in his advertising or on his label as to what his product contains. Upon receiving a note of protest from a retail druggists' association regarding his unfair advertising campaign, he replied blandly that if the druggists do not wish to sell his product there are plenty of other outlets through which it can be sold. His bluff should be called. It is because this manufacturer believes that retail druggists would not go so far as to refuse to sell his product or discourage sales of it that he assumes this attitude. He would probably sing a different tune if pharmacists refused to handle the product and it became known as a grocery store cough syrup.

The time has come when we should do some educational work with the general public or join with medical societies in doing it. It will take painstaking and consistent effort to combat much of the misinformation which is spread abroad on bill boards, through newspapers and magazines and over the radio but the individual pharmacist in his shop can do much with his customer. Honest, fair and helpful advice based on the facts in the case will be appreciated and while it may not always swell the day's profits it will bring returns in the long run.

"Big Business" in the drug trade has made merchandise out of packaged medicines and it is handling their distribution precisely as it handles automobiles, radios or shoes. The interests which control large drug manufacturing enterprises are no longer professional pharmacists. They can afford to hire the best professional brains to do their technical work. Advertising is their

weapon and its effects are far-reaching but it cannot escape the counterfire of facts. The American Medical Association has fought practically alone against this pernicious influence. It has recently been joined by the American Dental Association. It is time that professional pharmacy should line up definitely with its sister-professions in this battle for control of the confidence of the public in health matters. Shall our people diagnose their ills by comparing symptoms with those for which a patent medicine may be advertised and thus temporize with what may prove to be a dangerous ailment requiring medical attention or shall they be properly guided by pharmacists to physicians or hospitals where proper care will save them much distress? The pharmacist's opportunity to assist in public health education was never better and such activity will go just as far in maintaining his professional prestige as the filling of a prescription. It is the intention of this Committee to offer some concrete suggestions at the annual convention which may lead to closer coöperation between the physicians, dentists and pharmacists of New Jersey in combating patent medicine propaganda that has a harmful influence on the public.

ADDRESS OF THE CHAIRMAN OF THE SCIENTIFIC AND PRACTICAL SECTION OF MINNESOTA PHARMACEUTICAL ASSOCIATION.

BY FREDERICK J. WULLING.

Much emphasis has been placed during the past year upon the depression, but it seems that pharmacy has not suffered greatly. Work and especially development have gone on as usual. The depression has been felt much more on the business side of pharmacy than along professional lines. A real professional renaissance has been under way for some years. It has accelerated during the year rather than waned in many parts of the country, including especially Minnesota. The pharmaceutical emphasis has had a most affirmative reaction from physicians, and in numerous instances physicians have offered their coöperation to pharmacists. At a meeting of the Lyon-Lincoln Counties Medical Association at Marshall, Minnesota, before which I delivered an address upon request, practically every physician present from a territory extending fifty miles in every direction from Marshall had a pharmacist as his guest. On January 13, 1932, I was the guest speaker at the Hennepin County Medical Society luncheon meeting at which there was a gathering of nearly 300 including a good proportion of pharmacists who had been invited by the Society.

The programs of the Association district meetings, held during the summer to the number of eight or ten, were very successful, and their program stressed the need of a closer coöperation and understanding of physicians and pharmacists. At more than half of the number of monthly meetings of the Minneapolis Veteran Druggists' Association and at some of the St. Paul Veteran Druggists' Association physicians were present and supported pharmacists in their endeavor to encourage the more purely pharmaceutical practice.

Similar or identical activities have been going on with singular success at Cleveland, Milwaukee, Chicago, New York and in New Jersey, and elsewhere.

Substantial progress can therefore be reported to have been made during the past year in matters relating to the scientific and professional aspect of pharmacy, and pharmacists have complained less about the depression than any other group of professional or business men.

In my Chairman's address of last year, I omitted a reference to the fact that the Section had then completed a quarter century of constructive work. The proceedings of the Section would not be complete without a reference to its work and influence during the past twenty-five years, and therefore the reference is included in this year's address.[1]

In 1883 a comparatively small group of the more progressive and professionally minded pharmacists of Minnesota, principally of St. Paul, Minneapolis and Duluth, organized the Minnesota State Pharmaceutical Association. The purposes which these fathers of Minnesota phar-

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[1] The pagination is a convenient summary of the valuable and helpful contribution of the members of Minnesota Pharmaceutical Association to Pharmacy. Reference is made to it as it will appear in the printed Proceedings of the Association. It represents much work in tabulation and the percentage of scientific matter is most encouraging.

macy had in mind were principally (quoted from the Articles of Incorporation, filed November second, 1883):

1. "To improve the science and art of pharmacy by diffusing scientific knowledge among pharmacists;
2. "To suppress empiricism and to restrict the dispensing and sale of medicines to regularly educated pharmacists;
3. "To prevent the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines."

In the endeavor to fulfill these high aims, the Association immediately set to work on two very important objectives: (1) the enactment of a law to create a board of pharmacy to establish educational and practitional standards and to regulate the practice of pharmacy in the state and (2) the establishment of a college of pharmacy as an integral part of the University of Minnesota to afford adequate educational facilities for supplying the ranks of pharmacy with sufficiently trained recruits. Both objectives were soon realized: the State Board was created by legislative enactment in 1885 and the College of Pharmacy by legislative enactment in 1891 (Act of April 22, 1891. *Laws* 1891. Chapter 163, page 362).

Pharmaceutical affairs in the state gradually improved through the work of the Association, the State Board and the College. Standards were raised from time to time for a period of nearly two decades after the establishment of the Association. Then the commercial invasion became stronger and more assertive and penetrated into and colored Association activities. By 1906 the activities of the Association in purely scientific and professional respects had waned perceptibly, and the commercial activities had ascended up to a threatening degree.

At this point, assisted by some of the forward-looking pharmacists whose support I enlisted, I called the attention of the Association to the need of a greater observance of the underlying aims and purposes of the Association and of a lesser emphasis upon trade matters in the proceedings of the Association. After considerable prerequisite work on my part and on the part of those who were supporting me, a resolution was carried at the Duluth 1905 meeting to establish a scientific and practical section of the Association whose specific purpose was to be directed toward the development and extension of the more purely scientific and practical aspects of pharmacy. The incoming president, Charles H. Huhn, appointed me chairman of the newly established Section and gave me all necessary power to carry out the purposes for which the Section was created. Accordingly I immediately formulated a program for the guidance of the Section, extending many years into the future. The Section has just closed its first quarter century and has been continuously under my chairmanship since I was appointed to the chairmanship by every succeeding president since the organization of the Section.

The Section is the only one of its kind in existence anywhere. Some other state associations have Committees on Queries and Papers, but their functioning is negligible in comparison with the large volume of work the Section does. The AMERICAN PHARMACEUTICAL ASSOCIATION, which is a national body, has several sections which somewhat approach, but in a more specialized way, the work of the Minnesota Section.

At the first meeting of the Section, 9:00 A.M., Wednesday, June 27, 1906, I said in my Chairman's address among other things:

> "The chief object for which the Association was formed was soon lost sight of in the large amount of routine and some useless business annually transacted by the Association. It grew to be a fact that authors of papers, though never in large numbers, sometimes found no place or time in the program for the reading of their papers.
>
> "Ever since I am connected with the Association I have sought to obtain for the science and art of pharmacy a more deserved recognition on the part of the Association, and finally at the Duluth meeting last year succeeded in crystallizing the favorable sentiment of the meeting into the creation of a 'Section of Scientific and Practical Pharmacy' whose duty it shall be to develop the professional work of the Association, by preparing and carrying out annually a program of papers, addresses, symposiums and discussions on matters of practical, scientific and educational interest relating to pharmacy and associated sciences and arts.

....."I am confident that the creation of the Section will prove to have been one of the most noteworthy and important steps taken by the Association."

The prediction implied in the last paragraph quoted has come true in a very marked way. The rehabilitation and strengthening of the professional, scientific, educational and practitional spirit of the Association quickly followed the creation of the Section. The influence of the Section has never waned but has continually waxed. Its annual programs have long been well known outside of the state. The work of the Section has been mentioned in European current pharmaceutical literature, especially of England, Germany, France and the Scandinavian countries. Its annual programs have included men of great prominence, among them: all of the Presidents of the University of Minnesota: Dr. William Watts Folwell, Dr. Cyrus Northrop, Dr. George Edgar Vincent, Dr. Marion Leroy Burton, Dr. Lotus Delta Coffman; Dean J. C. Lawrence of the University of Minnesota, Dean Charles A. LaWall of the Philadelphia College of Pharmacy and Science, Dean Lucius E. Sayre of the University of Kansas, Dean Rufus A. Lyman of the University of Nebraska, Dean William B. Day of the University of Illinois, Dean Charles B. Jordan of Purdue University, Dean Harry Arny of Columbia University; Dr. David F. Jones, past-president of the A. PH. A., National Secretary H. C. Christensen of the National Association of Boards of Pharmacy, National Secretary Samuel Henry of the N. A. R. D., National Secretary E. L. Newcomb of the National Wholesale Druggists' Association; United States Senator Moses E. Clapp, United States Senator Knute Nelson, State Governors Burnquist, Christianson, Clough, Eberhard, Johnson, Lind, Preus; several State Senators and Representatives; Mayors of St. Paul, Minneapolis and Duluth; and many more.

The programs include addresses, papers and reports on matters relating to every field contributing to the professional side of pharmacy. The sessions of the Sections cover from one-half to one full day of the three-day annual conventions. All of the transactions are printed in the Association's annual *Proceedings*. Of this year book the transactions of the Section have included as much as fifty per cent of the entire *Proceedings* (50.3% in 1926) exclusive of Articles of Incorporation, Membership Roll, Commercial Travelers, Index, etc. The annual *Proccedings* constitute a very important part of the current annual pharmaceutical literature. They are read by interested persons and associations throughout the country and abroad. The Section has been the principal factor in creating everywhere in pharmaceutical and medical and related circles a very high respect and esteem for Minnesota pharmacy, many claiming that Minnesota is the leading state in matters of pharmaceutical standards. The work of the Section and of the Association has been recognized in a substantial way in England, and lately both were signally honored by the request for a complete set of the *Proceedings* for inclusion in the archives of the world-known National Science Library of the Science Museum of London. Another notable recognition of the Section transactions is found in the fact that the leading pharmaceutical journals and occasionally some medical journals request some of the Section papers for publication in their columns. References to the transactions and to some of their subject matter are frequently found in the current pharmaceutical journals and in the botanical, chemical and other abstracts. Through these transactions the Section has found a secure and effective place among scientific organizations.

I feel justified in mentioning the fact that I have carried practically alone the very considerable work and the responsibility involved in the administration and development of the affairs of the Section. No one who is not engaged in similar work realizes the time and energy that are necessary to insure the success of the activities of such a body as the Section. The Proceedings of the Section have always constituted a large proportion of the entire Association Proceedings as stated above. Thinking it would be of some interest to members of the Association, I have taken the trouble to compile a pagination giving the number of pages devoted in each of the Proceedings of the last twenty years to matters relating to the various divisions of the Proceedings as enumerated in the eight columns of the tabulation.

(The table referred to shows at a glance how large a proportion of the annual Proceedings is furnished by the Section.) The work of the Section is largely the basis upon which the Association has won its enviable standing in the world of pharmacy. Its work represents the aims and purposes of the fathers of Minnesota pharmacy and their successors. Its work is a testimonial to Minnesota pharmacy which has stimulated and supported the work. It is a question whether a

section of this kind even under competent executive and assertive management could prosper everywhere. That it has prospered here in Minnesota means that Minnesota pharmacy is committed to the perpetuation of high practitional, ethical, educational standards. The work of the Section could of course not have been effective had it not been for those pharmacists and contributors to the annual program who have dedicated much of their time and devotion to the maintenance and elevation of desirable and necessary standards. I want to take this opportunity of again thanking the many contributors during these past twenty-five years to the annual programs and to commend them for the very important part they have taken in the success and advancement of the Section and of the ideals which it represents.

One of the notable things the Association did at its 1931 meeting was the creation of a graduate fellowship carrying an annual stipend of $500, the incumbent of the fellowship to be a graduate of the University of Minnesota College of Pharmacy and to do his graduate and/or research work at the College. This is the second substantial contribution made by the Association to pharmaceutical education, the first having been the establishment of a scholarship a number of years ago carrying the annual College tuition. The College has already expressed its appreciation on behalf of the faculty and of the University administration and of graduate pharmacy in general for this Association interest in the College. These Association contributions are in direct support of the things the section is fostering and developing.

Appreciation and gratitude have been expressed to the Association for these contributions. Is it unwise to say that many other colleges of pharmacy are the recipients of a much greater number of fellowships, scholarships and other gifts, many of which come from individual sources? There ought to be a dozen fellowships at the College of Pharmacy as there are at other and no more important colleges. There are many individuals in Minnesota pharmacy who have become fairly well-to-do and who could easily establish additional fellowships and in larger amounts to stimulate research and graduate work. It may be that it is only necessary to point out, as I am doing herewith, not alone the desirability but the real need of a greater number of fellowships at the College. In this connection I may be pardoned for repeating what I heard in a recent conversation. The question of tithing was being discussed and its efficacy strongly asserted by a person who has been paying for many years now a tithe to his church. Another man pointed out that one's profession might well become the subject of tithing, and he stated that he had been tithing his Alma Mater for many years, sending to it amounts from 100 to 500 dollars annually. He stated that he firmly believed that tithing involved some natural or spiritual law whereby the tither as well as the tithed was blessed or advantaged. He ascribed his continuing and increasing prosperity to his tithing. I give you this for what it may be worth. Many believe in tithing. However, a belief in the efficacy of tithing is not necessary for the establishment of fellowships. Sometimes a feeling is sufficient that the calling or profession has been the means of one's propserity, and that a return to the calling of some small part of what the calling made possible would be a satisfactory contribution toward the continuation of what is necessary to insure or advance the interests of the profession for the welfare of those who are to come.

Many pass on to the Beyond each year. Others will report the names of the departed. I desire to mention only in a belated way the passing on of Mr. William A. Frost for the purpose of emphasizing how greatly those of us who are on the firing line miss his helpful and sympathetic encouragement. That he was an eminently scientific and ethical pharmacist has again come to my realization in the number of books and the subjects of which they treated that constituted his professional working library. Mrs. Frost was kind enough to donate this library to the College of Pharmacy. The books have been carefully inventoried and their titles indexed. Anyone interested may have a copy of the list of books and periodicals included in the library. The College was very glad indeed to reserve a section of the departmental pharmaceutical library for Mr. Frost's books. The section contains one hundred thirteen volumes.

My thanks go to the many contributors to this year's Section program including the chairmen of Association Committees who report to this Section.

In conclusion, I suggest that all reread the program for the development of pharmacy which I included in my last year's Chairman's Address. Everyone should have an individual and collective program to work by.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

BALTIMORE.

The February meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Emerson Hotel on Thursday, February 18, 1932.

Dr. Andrew G. DuMez, dean of the School of Pharmacy of the University of Maryland, addressed the Branch, and had for his subject "The Development and Trend of Pharmaceutical Education in America."

Dr. DuMez traced the progress of pharmaceutical education from colonial times, when almost anyone who desired might practice, through the stages of apprenticeship, night courses, and part-time courses, to the four-year college standard of to-day. He mentioned the part played by the various Pharmaceutical Organizations in prompting pharmaceutical education and emphasized the vital part played by the various Schools of Pharmacy in the evolution of Pharmacy from a medieval art to its present-day status among the sciences.

E. G. Eberle discussed the paper of Dr. DuMez and referred to the important part played in the development of Pharmacy in Pennsylvania by Dr. Morgan and the Marshall family, quaker practitioners of about a century and half ago.

Reports were received from the secretary-treasurer and from the chairmen of the various committees.

The following officers were elected and installed for the ensuing year:

President, Marvin R. Thompson.
Vice-President, Harry S. Harrison.
Secretary-Treasurer, William F. Reindollar.

In a short address President Thompson expressed his appreciation of the honor accorded and outlined in brief the policies and plans of the Branch for the ensuing year.

WILLIAM F. REINDOLLAR,
Secretary-Treasurer.

CHICAGO.

The regular monthly meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday, February 16th, at the University of Illinois School of Pharmacy.

The meeting was presided over by President Terry. The speaker of the evening was Dr. Kirby of the Abbott Laboratories. His subject was "Selling for Profit."

Dr. Kirby introduced his subject by stating that the trade is now profit-minded and no longer volume-minded. Some excerpts from his discussion were:

That a one-cent sale is not a sale and that the loss involved should be charged to advertising, not to sales.

The average druggist spends fifteen minutes a day buying merchandise and fifteen hours selling. Dr. Kirby pointed out the folly of such a procedure and urged the retailer to spend more time studying merchandise and prices.

The Chain Stores report that in buying up stores they usually find the profits in the basement, in the form of unsold deals. Deals will not bring additional profit until the merchandise has been sold. Sustaining profits come only from the sale.

The retailer is beginning to feel the asset of the clerk behind the counter. The clerk must be a salesman.

In the United States there are an average of 2106 consumers per drug store. We have many restraining laws, but no law which prevents the druggist from raising this number for his drug store.

Your possible methods of "Selling for Profit" were outlined:

1. Same volume—greater price.
2. Greater volume—same price.
3. Still greater volume—same price.
4. Greater volume—less price.

The third plan was shown as being the only logical plan to be adopted. In carrying out this plan Dr. Kirby suggested that an accurate survey be made of the surrounding territory and that plans be made for the volume expected from that territory. Advertise and make personal calls during the dull hours of the day. Give the clerk a chance to show his salesmanship by sending him on some of these personal calls.

A chart was displayed showing as an example a Commodity Market: Study the germicides grouped as mercurials, chlorine derivatives and coal-tar products. Under these groups were listed the trades that used these germicides. It clearly showed the possibilities of the druggist increasing his profits by widening his scope, and acquainting the doctors, hospitals, florists, seedsmen, janitors and poultrymen of their needs that can be purchased at the drug store.

Instances were cited of potential customers buying at some distant point because they were unaware that the druggist could furnish what they needed.

Dr. Kirby followed his discussion with a few remarks regarding the National Pharmacy Week displays for this coming October. The displays are to consist of growing plants. It was urged that group connections be made between the druggists and florists for the furnishing of these plants.

Dr. Kirby furnished the secretary with the names of some florists and the plants they can furnish.

After a brief discussion the meeting was closed by a rising vote of thanks to the speaker of the evening.

LAWRENCE TEMPLETON, *Secretary.*

DETROIT.

The February meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the Y. M. C. A. Building, Thursday evening, February 18th. The meeting was preceded by a well-attended dinner. President Liddell called the meeting to order. The minutes of the previous meeting were read and approved.

President Liddell then presented as the speaker of the evening—Howard. T. Graber—who presented a very interesting and instructive paper entitled, "Enzyme, Endocrine and Protein Compounds." He said enzymes and protein compounds are old subjects but not so the endocrines. Enzymes do not enter into reactions, nor are they used up, but by catalysis set in motion a reaction between two other substances. By adding an enzyme to milk in the proportion of 1 part in 800,000 the first step in cheese making is performed.

Without enzyme action there could be no butter-fat. The activity of enzymes in nature, not alone build up the important bodies upon which we subsist, such as starch, sugar, albumen, meat, etc., but also enzyme activity which is necessary to break them down and assimilate them.

The endocrines are marketed in the form of dry desiccated gland and also in the form of solutions for hypodermic and intravenous injection. In some cases desiccations are made from the purified solutions or active hormones.

Mr. Graber said that until a few years ago desiccated thyroid was the only endocrine accepted by the medical profession; however, at the present time others are used successfully.

The discussion by Mr. Graber brought attention to the care and precaution taken in the manufacture of this important class of medicinals, and the biological and pharmacological standardization necessary to place the various preparations with unimpaired therapeutic efficiency in the hands of the medical profession.

A discussion followed which was lead by Dean R. T. Lakey and Dr. L. A. Seltzer.

A rising vote of thanks was tendered the speaker.

BERNARD A. BIALK, *Secretary.*

NEW YORK.

The February meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, which was featured as "New York State Pharmaceutical Association Night,"

was held at the College of Pharmacy, Columbia University, on Monday, the 8th, the chair being taken by President Robert P. Fischelis. Over 100 persons were present.

Owing to the length of the scheduled program the reading of the minutes and the Treasurer's report were dispensed with.

Dr. Mayer, for the Audit Committee, reported that he had approved the bills submitted to him.

Chairman Miller, of the Membership Committee, submitted the name of Harry Goldschmidt, and the secretary that of Herbert B. Falk, for membership of the Branch; these were approved. The secretary reported that Messrs. Horace M. Carter, Edward Gassler and Bernard W. Zlinkoff had become members of the Branch through joining the parent organization.

The president said he wished to express the thanks of the Branch to the Editors of the *New York Journal of Pharmacy*, the *Apotheker Zeitung* and the *New York Pharmacist* for the publicity which they had given to this meeting.

Dr. Schaefer, reporting for the Entertainment Committee for the Meeting of the Boards and Colleges of Pharmacy of District No. 2, said that the dinner to be tendered to the visitor would be held on Monday, March 14th, at the Hotel Pennsylvania, and that a vaudeville entertainment was being provided through the courtesy of the *American Druggist*. He drew attention to the fact that this year marked the 25th Anniversary of the founding of the New York Branch and suggested that this dinner would be a suitable occasion to celebrate this event.

The president said that he had before him a record of the first meeting of the Branch on March 16, 1907, and that he was pleased to see that several members whose names were on that record were present at the meeting tonight; he called upon Dr. Diner to move that the March meeting should take the form of a dinner, as planned by Dr. Schaefer and his committee, to celebrate the founding of the New York Branch. The motion was made and carried.

Dean Arny rose to point out that there were several distinguished guests present and mentioned the names of Dr. R. B. J. Stanbury, secretary of the Canadian Pharmaceutical Association; Dr. E. F. Kelly, secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION; Vice-President L. M. Kantner of the Maryland Pharmaceutical Association, and President-Elect W. Bruce Philip, of the A. PH. A. and Counsel for the N. A. R. D. President Fischelis welcomed these guests to the meeting and called upon them for a few words.

Dr. Stanbury said that he considered himself very fortunate in having an opportunity to attend the Branch meeting; he wished to call the attention of all to the Joint Convention of the Canadian Pharmaceutical Association and the AMERICAN PHARMACEUTICAL ASSOCIATION in Toronto, on August 22nd to 27th, at the Royal York Hotel; he hoped for a large attendance and said he could assure everyone that they would be well entertained.

Dr. Kelly referred to the convention at Toronto, saying that it would be an unusual event in every respect and that he hoped a great number would attend; he was glad to be present at the New York Branch meeting and wished to congratulate the officers on the interesting programs they had arranged; he was particularly pleased to see the Branch and the State Association holding a joint meeting, and recommended such meetings to other Local Branches.

Mr. Kantner tendered to the Branch the greetings of the Baltimore Branch and of the Maryland Pharmaceutical Association and said that it gave him great pleasure to be present.

Dr. W. Bruce Philip spoke briefly of the problems facing pharmacy, pointing out the need for the development of the professional side; he congratulated the New York State Pharmaceutical Association and the Branch on the work they were doing.

Dr. Fischelis introduced Dr. Albert A. Muench, president of the New York State Pharmaceutical Association, who now took charge of the meeting.

President Muench said that it was an honor for the State Association to hold a joint meeting with the New York Branch, that the AMERICAN PHARMACEUTICAL ASSOCIATION always stood as a beacon of light for pharmacy, and that the most important work of the State Association was its activity in legislative matters. He spoke in general terms of the work of the Association and stressed the fact that new members and active workers were needed; he hoped that there would be free discussion at this meeting.

Chairman John F. O'Brien, of the Legislative Committee, presented his report; he spoke of the re-introduction of the bill of the State Association dealing with poisonous, habit-forming and deleterious substances, the sale of

which would be restricted to pharmacies, and hoped it would be passed. He referred to the New York Junior Capper-Kelly Bill, which had been modeled after the California Junior Capper-Kelly Bill, and said that the Association wanted the active and financial support of all pharmacists for this bill; he hoped that Dr. W. Bruce Philip, the author of the California Bill, would help the State Association in its work on its bill.

Dr. Wimmer rose to say that he had been appointed chairman of the Legislative Fund Committee to raise money for this work; that appeals to pharmacists would be sent out to the number of 7000, and that pharmaceutical associations would be asked to contribute $100 each to the fund. Without generous support the Association would be unable to protect retail pharmacists against laws detrimental to their welfare.

There was considerable discussion on the sale of deleterious substances such as barbituric acid compounds, Messrs. Fischelis, Brodkin, Lichtman, Lehman, Seley and Kopald taking part. A motion was made and carried to ask the Commissioner of Health of the City of New York to help the State Association to pass its bill, since the Health Department of the City has recently ruled that barbituric acid and its compounds may only be supplied on prescriptions.

Professor Monell, chairman of the Committee on Economics, read the list of questions appearing on his proposed questionnaire to be submitted to the pharmacists of the State this year; he said that one of the most important facts to be determined for each independent retail pharmacist was his decrease in business for the current year in order to see whether it was greater or less than the average as determined by the questionnaire. He stated that of all chain stores, only drug store chains showed an increase in volume of business for 1931 over 1930. He hoped that all pharmacists would coöperate with him in filling out the questionnaire.

A discussion took place in which Messrs. Bardfield, Canis, Kopald and Brodkin joined; Mr. Brodkin said that a large wholesale drug house was now billing merchandise in three columns headed (1) Patents, (2) Sundries and (3) Drugs, Chemicals and Prescription Items; from this a pharmacist could see at a glance the volume of business done under each heading.

Chairman J. Leon Lascoff, of the Committee on U. S. P. and N. F. Propaganda, endorsed the idea of Physician-Pharmacist meetings, such as had been held by the Branch last spring; he referred to the exhibit of U. S. P. and N. F. preparations which he had on display and suggested that the booklets on U. S. P. and N. F. Propaganda which had been prepared by the State Association should be distributed by pharmacists to physicians in their locality; copies could be obtained from him. He vigorously protested against the practice of certain large pharmaceutical manufacturers who put up special preparations from their own formulas, using U. S. P. Official Titles on the labels, immediately followed by the word "Special" or their own name; this they had no right to do, since it was misrepresentation and misbranding and, in many cases, the product was cheaper than and inferior to the U. S. P. article. He referred to an editorial in the December issue of the *New York Pharmacist* dealing with a movement by patent-medicine proprietors and an editor of a national drug journal to start a campaign for self-medication by the public; he felt that this was a menace to public health and fraught with danger to physicians and pharmacists.

Mr. Brodkin advised the closest coöperation between pharmacists and physicians since this was the only way to cope with the campaigns of the patent medicine makers which gave no profit to the pharmacist. Dr. Diner and Mr. Gesoalde spoke of the U. S. P. propaganda that had been carried out in New York and Brooklyn and hoped that the State Association would some day be able to employ a detail man to visit physicians on behalf of the independent pharmacists, as the Kings County Society had done in Brooklyn.

Chairman Mayer, of Committee on U. S. P. Revision, said that his committee welcomed the receiving of comments and suggestions on U. S. P. preparations for consideration in regard to the revision now being carried out.

Chairman Henry Jansen, of the Committee on Fair Trade, presented a paper in which he reviewed the present trade situation; he referred to the work of his committee in regard to fair prices. He was glad to notice the great decrease in the number of "combination deals" and said that nothing should be left undone to abolish them altogether; he also was pleased to be able to report that 91 perfume shops had gone out of business this year.

Chairman Schaefer of the Committee on Pharmacy and Queries, asked for a large number of papers by pharmacists to be read at the

coming Convention and pointed out that prizes would be awarded to those of the highest merit.

Chairman Wells, of the Committee on Time and Place for the Annual Convention, reported that plans had been settled to hold the Convention at the Grand Union Hotel at Saratoga Springs during the week of June 20th, and that everything possible was being done to make it an outstanding success.

Chairman M. S. Malakoff, of the Committee on Information, spoke of the work of his committee in issuing releases to the press informing the public of what the State Association is doing for the protection of the public health, etc. He briefly reviewed the work of the past year of the A. PH. A., the N. A. R. D., the Druggists' Research Bureau, the Philip Survey, the St. Louis Survey and the New York Conference.

Mr. Gesoalde said that in connection with pharmaceutical publicity in the endeavor to make the public "pharmacy minded," stress should be laid upon the educational requirements for pharmacists; he hoped that the Committee on Information would try to induce manufacturers to endorse the services of the pharmacist on their radio programs in the same way as they have been giving publicity to the work of dentists and physicians.

Dr. Fischelis said that in line with the scheme to make the public "pharmacy-minded" he wanted to bring to the attention of the meeting a suggestion from a New York pharmacist for the pharmacist's photograph to appear on his annual registration card, which was displayed in the pharmacy; from this, customers would know when they were dealing with a registered pharmacist and not merely an unregistered clerk. So that this idea might be discussed at the State convention in June, Dr. Fischelis handed over some material relating to it to the State President.

Chairman R. S. Lehman, of the Committee on Membership, said that in view of the important legislative and other matters that were on the program of the State Association, it was necessary to increase their membership, and he hoped that any present at the meeting who were not members would join and would encourage others to do so, too; blanks could be obtained by writing to him at 295 Washington Ave., Brooklyn.

Dr. Muench then turned the meeting over to Dr. Fischelis, who said how pleased the Branch had been to hold this joint meeting with the State Association.

The meeting concluded at 11:35 P.M. with a rising vote of thanks and applause to all the speakers.

HERBERT C. KASSNER, *Secretary.*

PHILADELPHIA.

The February meeting of the Philadelphia Branch of AMERICAN PHARMACEUTICAL ASSOCIATION was held in the Pharmaceutical Laboratories Building, John Wyeth & Bro., Inc., Philadelphia, on the evening of February 9, 1932.

Vice-President Roberts called the meeting to order at 8:30 P.M. The minutes of the January meeting were read and approved. Newly elected members were next introduced.

Under new business Vice-President Roberts appointed the following nominating committee to report during the March meeting: Chairman Dr. M. S. Dunn, Dr. Frank Eby and Prof. Harvey Frank.

The subject for discussion—"A Symposium on Ergot" was then announced. The Botany and Pharmacognosy of Ergot were discussed by Dr. Frank Eby. Dr. Eby carefully described and illustrated the various phases of growth of this parasitic drug; its host and how the drug enters the market.

Mr. Alfred Barol followed with his discussion of the Commerce and Manufacture of the various products containing Ergot. He contrasted the European and American products, showing the tendency in Europe is to isolate the active constituents and use them as such, while in America it is customary to use the fluid or other extractives, without isolating the active constituents.

Dr. Marvin R. Thompson gave a detailed exposition of the "U. S. P. Method of Ergot Standardization," pointing out the deficiencies of the method, with certain recommendations for its improvement. Of decided importance was his explanation of the various constituents present, naming and comparing those which were physiologically active with those physiologically inert. Dr. Thompson is an enthusiastic exponent of the Epinephrine Reversal Method for standardization of Ergot products.

He stated it was possible to attain better end results for assigning definite values to finished Ergot products than available with the official method. He volunteered to demonstrate this method to any or all interested.

Drs. Luedres and Toland while discussing the "Clinical Indications and Uses of Ergot" cited various recorded cases and results obtained.

A number of cases where the use of Ergot may be indicated, do not permit its use due to certain forms of diabetes being present. Some physicians are averse to its use due to a lack of knowledge of clinical results obtained, while others consider it an unsuitable drug but prescribe it in the absence of one that is better.

The meeting adjourned so that those present could inspect the recently renovated Pharmaceutical Laboratories of our hosts. After the inspection a buffet luncheon was served and enjoyed by all.

The officers of the Branch and the members present take this opportunity of expressing their appreciation for the reception accorded them.

WILLIAM J. STONEBACK, *Secretary.*

DINNER AND ENTERTAINMENT, NEW YORK BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The meeting of District No. 2, consisting of delegates of the National Association of Boards of Pharmacy and of the American Association of Colleges of Pharmacy and representing the States of New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia and the District of Columbia, was held in New York City on March 14 and 15, 1932. The New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION made arrangements for a dinner and entertainment at this time, at which the visitors were guests.

An elaborate vaudeville entertainment was also arranged following the dinner, in place of the usual set speeches.

At this time the New York Branch observed the 25th Anniversary of its founding, and this dinner gave its members an opportunity to celebrate this event in its history; the function took the place of the regular March meeting of the Branch. The dinner was held at the Hotel Pennsylvania on Monday, March 14th, at 7 P.M.; further mention will be made in next issue of the JOURNAL.

ROBERT P. FISCHELIS, *President.*
HERBERT C. KASSNER, *Secretary.*
HUGO H. SCHAEFER, *Chairman,* Entertainment Committee.

THE DANGERS IN SALES OF MEDICINES.

The following editorial, appearing in a recent issue of the *Clarinda* (Iowa) *Herald,* reveals that its author is deserving a vote of thanks from pharmacists. Furthermore, the article is worthy of being brought to the attention of other newspaper editors, with especial emphasis on the last sentence:

"Recently when the secretary of the Iowa State Board of Pharmacy was in this vicinity, he had occasion to arrest and assess fines against several cafes in neighboring towns for selling aspirin. It seems that the law regarding drugs makes it unlawful for other stores than drug stores to sell certain deadly drugs. The reason is perfectly evident—as protection for public health. For instance, arsenic. Sold to kill rats, perhaps. Yes, but suicides find it a handy drug to use also. Thus dealers selling arsenic or other poisons are compelled to keep a registry of the names of folks they sell to. The coroner thus can make the rounds of the stores, after a person dies of poisoning from some deadly drug, find the name of the person who bought the drug, and when.

"Patent medicines may be sold other than in drug stores, since their composition is unknown, and the label on the bottle tells the dose. Perhaps some of them are humbugs; waste of money perhaps to buy, when the same money spent consulting the family physician and purchasing a prescription from the drug store will bring better results. But if people wish to waste their money, that's the individual's business. Protecting public health through throwing up safeguards is quite another thing.

"On much the same principle laws are much more strict as to education required from a physician who prescribes drugs than it is from one who uses, say massage treatment, but gives no medicine. Drugs have the power either to kill or cure. Most of us go to the doctor or the drug store wishing a cure. But the same hand which hands out the medicine to cure has the power likewise to hand out the kill kind; hence must have sufficient education and experience to know one kind from another."—From *Northwestern Druggists.*

REPRESENTATIVE LAGUARDIA TO OFFER SUBSTITUTE FOR PROPOSED SALES TAX.

Because of his belief that the attempt to establish a sales tax will fail, as, he said, it has in the past, Representative LaGuardia (Rep.), of New York City, announced March 11th that he would offer a substitute for the sales tax plan when the revenue bill is being read for amendment. The substitute which Mr. LaGuardia will offer, he said, would raise an additional $518,500,000 in revenue.

EDITORIAL NOTES

Editor: E. G. Eberle, 10 West Chase Street, Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, H. A. B. DUNNING, WILLIAM B. DAY, C. E. CASPARI, J. H. BEAL, W. BRUCE PHILIP, T. J. BRADLEY. *Ex-Officio Members:* WALTER D. ADAMS, *President;* J. G. BEARD, J. W. DARGAVEL, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* THOMAS ROACH, *Chairman of the House of Delegates.*

Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; E. N. GATHERCOAL, *Chairman,* N. F. Revision Committee; Chairmen of the Sections, A. PH. A.: L. E. WARREN, C. J. CLAYTON, W. G. CROCKETT, ROWLAND JONES, J. T. LLOYD, TOWNES R. LEIGH, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; A. L. I. WINNE, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P. Scientific Section—Board of Review on Papers: *Chairman,* GLENN L. JENKINS, Baltimore, Md.; EDWARD E. SWANSON, Indianapolis, Ind.; W. J. HUSA, Gainesville, Fla.

LET US ASSIST YOU IN SOLVING PRESCRIPTION PROBLEMS.

As stated in former issues of the JOURNAL OF THE A. PH. A., Dr. S. L. Hilton, former President of the A. PH. A. and Chairman of its Council, well and favorably known pharmacist of Washington, has consented to answer problems that come up in prescription practice. We, therefore, invite those who have problems to send them to this office at 10 W. Chase St.

REPORT ON THE DRUG STORE SURVEY.

The conference on the St. Louis Drug store Survey will be held in St. Louis April 26th and 27th. The program committee met in New York, February 15th, and drafted a program of addresses by which the information can be given to the drug industries most effectively. The committee consists of Ray Whidden, Chicago; Carl Meyer, St. Louis; Secretary E. L. Newcomb, of the National Wholesale Druggists' Association; Chairman E. Fullerton Cook, of the U. S. P. Revision Committee; J. M. Drescher, St. Louis; Harry J. Schnell, Herbert Mayes, Aglar Cook, Frank Blair, Stanley I. Clark, New York City; R. E. L. Williamson, Federal Wholesale Druggists' Association.

Dr. Frank A. Delgado of the St. Louis Survey service has promised a report for the JOURNAL to be used in the April issue. He also advises that publications on the Survey are to be issued in the near future as follows:

On Drug Store Rating, a publication of about 126 pages in length. A second publication dealing with the *Causes of Failures among Drug Stores* of about twenty-three pages in length and this will be part of the National Drug Store Survey. A third or fourth publication available about the end of April will report on *Prescription Department Sales in the Retail Drug Stores.*

Dr. Delgado is a practical pharmacist and his comprehensive reports will be of great value and interest. The various surveys now being made on different phases of prescription practice will not only acquaint pharmacists with the importance of their activities, their value, but also the departments of the government and the people generally.

On account of the number of pages given elsewhere to prescription analyses further comment will be deferred.

ADDITIONS TO THE BELGIAN NATIONAL FORMULARY.

It is proposed to include the following formulæ in a new edition of the Belgian "Formulaire National."

ELIXIR ACIDI NUCLEINICI.

Nucleinic acid	6.70	Gm.
Sodium glycerophosphate (50 per cent)	13.35	Gm.
Water	20.00	Gm.
Sodium methylarsenate	1.70	Gm.
Vanillin	0.02	Gm.
Alcohol	50.00	Gm.
Strong wine (*e. g.*, sherry) to	1000	cc.

SAL VICHY FACITIUM.

Sodium phosphate	20	Gm.
Potassium phosphate	50	Gm.

Sodium chloride	80 Gm.
Sodium bicarbonate	850 Gm.

OPIALUM OPII ALKALOIDEORUM PRINCIPALIUM HYDROCHLORIDI.

Narceine hydrochloride	1.0 Gm.
Thebaine hydrochloride	2.0 Gm.
Codeine hydrochloride	2.5 Gm.
Papaverine hydrochloride	4.0 Gm.
Sodium chloride	10.5 Gm.
Narcotine hydrochloride	30.0 Gm.
Morphine hydrochloride	50.0 Gm.

PASTA CALLOT NO. 1.

Camphorated phenol	6 Gm.
Camphorated naphthol	6 Gm.
Guaiacol	15 Gm.
Iodoform	20 Gm.
Anhydrous lanoline	100 Gm.

Callot's paste, No. 2 is half strength.

SOLUTIO CALLOT.

Olive oil	70 Gm.
Ether	39 Gm.
Iodoform	10 Gm.
Guaiacol	1 Gm.
Creosote	5 Gm.

From the *Pharmaceutical Journal and Pharmacist.*

SHAVING CREAM.

The following is the formula of a cream for shaving without water or brush:

Spermaceti	5.0
Borax	3.0
Stearic acid	20.0
Glycerin	20.0
Distilled water	80.0
Hard soap	10.0
Caustic soda solution (20 per cent)	2.0

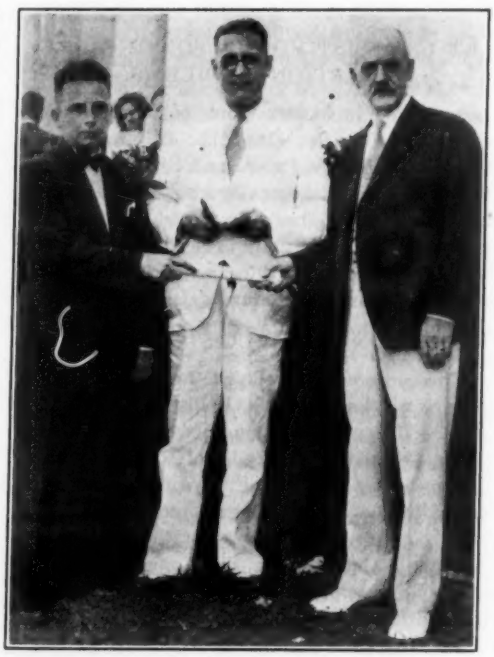
The method of preparation is to liquefy the solids over a water-bath, add the soda solution, and stir in after it has been removed from the source of heat.—From *Chemist & Druggist.*

BRIEF ITEMS FROM PORTO RICO.

BY CÉSAR A. TORO.

At the last meeting of the Pharmaceutical Association of Porto Rico it was moved by President Toro to extend to the AMERICAN PHARMACEUTICAL ASSOCIATION a hearty invitation to hold a meeting in Porto Rico, and this motion was unanimously approved,

Porto Rico pharmacists were honored by a visit of Dean John R. Minehart, accompanied by Mrs. Minehart, Mrs. (Rev.) Francis Wetherill, Hon. T. Z. Minehart, Dr. Senica Egvert and daughter, and Wm. Ziesel. These visitors were received by delegations from the College of Liberal Arts and of Pharmacy in the name of the University of Porto Rico. Members of the medical, dental and pharmaceutical associations and the alumni group accompanied the visitors during their stay. They visited the historical Morro Castle, the School of Tropical Medicines, at which time Dr. Senica Egvert complimented Dr. Bailey K. Ashford, in the name of his friend, Dr. H. K. Mulford. A visit was also made to the Asylum for the Insane and to the University of Porto Rico where luncheon was served.



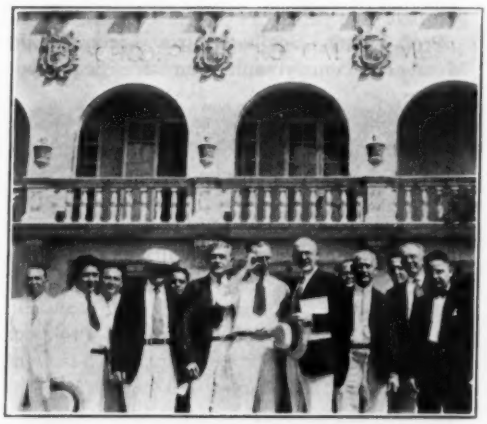
Mr. Washington Llorens, Secretary-Treasurer of the Pharmaceutical Association of Porto Rico, receiving from Dr. Minehart the Temple Alumni Gold Medal for 1931. With them, Dr. Carlos E. Chardon, Chancellor of the University of Porto Rico.

Chancellor Carlos E. Chardon addressed the visitors and Dean Minehart responded. A banquet was provided by the Alumni Group at Cosmo Springs.

The Temple Alumni Medal for 1931 was conferred by Dean Minehart on Secretary-Treasurer Washington Llorens, of the Phar-

maceutical Association of Porto Rico. Hearty congratulations were extended to him.

A new Pharmacy Bill has been presented for consideration by the Legislative Assembly. It was prepared by the Committee on Legislation of the Association and has the approval of the pharmaceutical profession; it is intended to elevate the professional standard of pharmacy in Porto Rico and secure protection for the people.



John R. Minehart and companions during their visit to the School of Tropical Medicine, at San Juan, Porto Rico. In the center, Dr. Blackman, Director of the School and Dr. Bailey K. Ashford.

BRIEF NEWS ITEMS FROM MEXICO.

BY DR. G. G. COLIN.

PROFFESSIONAL PHARMACY IN NEED OF REGULATION.

Local newspapers have been giving wide publicity to accidents due to mislabeling of prescriptions. In one case the customer assaulted the pharmacist, who in turn used a gun in self-defense, wounding the customer; labels had been changed in a prescription calling for preparations, one for oral and the other for external use. In another case a little girl was the victim: A poisonous substance was used to compound the prescription, by mistake.

Since this publicity is detrimental to professional pharmacy, the Sociedad Farmacéutica Mexicana will take action in the matter. A memorial is being prepared demanding the much-needed regulation of ARTICLE IV of the Constitution as regards the practice of pharmacy.

There are approximately 5000 pharmacies in the Mexican Republic, of which the majority are not conducted by professional pharmacists, since the law does not specifically demand it. Anyone so desiring may run a pharmacy, simply stating on his labels and store signs that he is not a professional pharmacist. The only legal requirement is to place the statement "Responsable sin titulo" under the name of the proprietor. The Mexican Health Department has repeatedly called the attention of competent authorities to the fact that such a situation is a constant menace to public health. However, since the enforcement of a law regulating the practice of pharmacy would seriously affect the interests of a large group, the affected ones have always been prompt in repealing any attempt of regulation by Congress. A similar situation is prevalent as regards other professions like medicine, chemistry, engineering, law, where competition from non-professional men gives rise to frequent accidents and mishaps.

COÖPERATION BETWEEN PHARMACISTS AND PHYSICIANS.

The Pharmaceutical Association of Monterrey, Nuevo León, held a meeting to celebrate the anniversary of its president, Sr. M. Mendoza Vazquez.

The necessity of closer coöperation between pharmacists and physicians was emphasized by Prof. L. Galván Terviño and favorably commented by Dr. N. L. Tamez, the latter representing the Mexican Medical Association. The beneficial results of such coöperation was also discussed in relation to the development of national pharmaceutical industry. Physicians were exhorted to prescribe products manufactured in the country in order to restrict the importations of similars.

PERSONAL AND NEWS ITEMS.

Dean Wulling attended the meetings of the Iowa State Pharmaceutical Association and the joint meetings of the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy at Cedar Rapids, Iowa, February 16th to 19th, inclusive. He gave a lengthy address to the joint meeting of the boards and colleges, and a briefer one to the Iowa Pharmaceutical Veterans' Association.

M. H. Doss, of Apalachicola, was appointed chief state drug inspector, effective March 1st,

it was announced by Dr. Henry Hanson, state health officer and the executive official for the Florida State Board of Health. Mr. Doss has been acting chief inspector since January 1st. **Frank S. Castor,** of Tampa, was named assistant inspector.

The Brooklyn College of Pharmacy gave a dinner in honor of **Prof. William Henry Weygandt** who has just completed his twenty-fifth year of service as the chairman of the college.

W. D. Patterson, of El Reno, Oklahoma, has been appointed member of the Oklahoma State Board of Pharmacy, succeeding **J. C. Burton,** Stroud, who recently resigned.

Former President D. F. Jones has sent us a copy of a poem by Miss Lucile Runestrand which was the result of the annual inventory-taking. The lines are interesting and evidently depict the activities of the annual occasion.

We are in receipt of a reprint from the *Journal of Chemical Education* on "Pharmaceutical Education" by **Dean Wortley F. Rudd.** In it, a brief survey is given of the influences that have brought about the changed condition in pharmacy, what is being done to improve these conditions and what pharmacy will be when all who go into it have a full four years of college work, two of which are almost entirely fundamentally cultural in their content are discussed. In this connection efforts are being made to bring about uniformity in college courses in so far as the last year of the curriculum applies.

On the occasion of the 27th anniversary of **Harry Vane** as proprietor of Vane's Drug Store in Dover, Del., the newspapers gave publicity to the event and also a brief account of his activities in pharmacy.

Dr. John C. Krantz, Jr., has been invited to participate in writing the medical history, being prepared by the Medico-Chirurgical Faculty of Maryland.

Lawrence S. Williams, former president of the Maryland Pharmaceutical Association, was one of the speakers at the meeting of the West Baltimore Medical Association attended by the Alumni Association of the School of Pharmacy of the University of Maryland. The subject dealt with U. S. P. and N. F. products.

The University of North Carolina School of Pharmacy is collecting items for its museum. Among the recent donations is an old single arm brass balance standing 2½ ft. high, presented by **Dr. E. V. Zoeller** of Tarboro. It was used by him for forty-six years and previous to that time by McNair Drug Company.

Walter V. Smith, who has closed his fifty years in the drug business, was honored with a dinner by the Philadelphia Drug Club Veterans, on February 26th.

Prof. Freeman P. Stroup, of Philadelphia, and **George F. Crouse,** of Smithton, Pa., have been elected life-members of the Pennsylvania Pharmaceutical Association.

Mrs. W. Bruce Philip has arrived in Washington and our president-elect is happier. As many of our members know, Mrs. Philip is a pharmacist.

Prof. Louis Saalbach has become Life Member of Pennsylvania Pharmaceutical Association.

We regret to learn of the illness of former President of the A. PH. A., L. L. Walton, but glad to learn he is convalescing at Clifton Springs, N. Y. Mrs. Walton accompanied him.

The March number of the *Texas Druggist* has an early picture of the faculty and members of the University of Texas pharmacy class. In the picture are shown the first dean and professor of pharmacy, namely, Professor Kenedy and Dr. Wm. F. Hubbert, then a student of the class. The latter is a member of the AMERICAN PHARMACEUTICAL ASSOCIATION.

The *Pacific Drug Review* for March contains a number of forceful editorials on matters of present interest.

The cover of the March *Druggists Circular* is illustrated by a number of men of science. Pasteur was a member of the pharmacy faculty at Strasbourg, Sir Humphry Davy was an apothecary's clerk.

The *American Druggist* discusses the history of the words "pharmacy" and "apothecary." This reminds us that the definitions for "pharmacist" and "druggist" in textbooks and dictionaries can be improved.

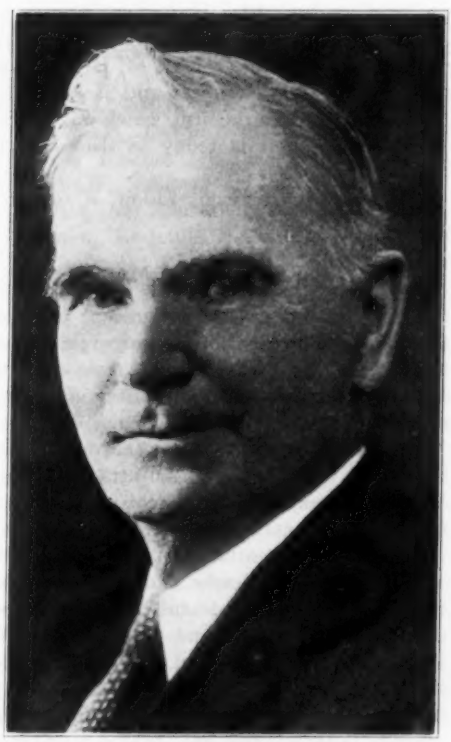
BALTIMORE RETAIL DRUGGISTS' ASSOCIATION.

The annual banquet of the Baltimore Retail Druggists' Association was held at Hotel Rennert, March 10th. Nearly 300 members and guests were in attendance and the banquet was presided over by President Samuel Y. Harris. A fine program was carried out. The Mayor and W. Bruce Philip delivered short addresses and other guests were introduced. A number of officials of Baltimore were in attendance. The Program Committee was eminently successful with their entertainments and received the applause of those who attended.

OBITUARY.

The death of Charles F. Kramer has removed a devotee of sterling character from American Pharmacy, one who always upheld the highest ideals of his profession and through his untiring efforts served his fellow-pharmacists well. Mr. Kramer was stricken with a heart attack while seated in a street car en route to his office on Friday morning, February 19, 1932.

The deceased, served his apprenticeship with W. F. Horn of Carlisle, Pa., being in his employ for three years. In 1880 he matriculated in the



C. F. KRAMER.

Philadelphia College of Pharmacy and was graduated in 1882. In 1881, he entered the employ of Henry C. Blair Sons, Philadelphia. After graduation from the Philadelphia College of Pharmacy he became head clerk in the Blair Drug Store, which position he held for ten years, when he purchased the drug store of John Schlosser, located at Third and Broad Streets, Harrisburg; he moved the location of his store to 3rd and Reily Streets during the past year.

On September 13, 1910, Mr. Kramer was appointed a member of the Pennsylvania Pharmaceutical Examining Board by Governor Edwin S. Stuart and has been reappointed at the expiration of each term ever since. At the time of his original appointment on the Board he was president of the Dauphin County Pharmaceutical Association, vice-president of the Pennsylvania Pharmaceutical Association and a member of the National Association of Retail Druggists. He became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION.

Mr. Kramer has held various offices in the State Board of Pharmacy and was secretary of the Board, and director, Divisions of Drug Store Registration and Pharmacy Apprentice Registration at the time of his death. He was always much interested in legislation affecting the interests of pharmacists, and has been a member of both the State and County Legislative Committees for a number of years.

In June 1925, Mr. Kramer received the degree of Master in Pharmacy from his *Alma Mater* and in June 1931 the Pennsylvania Pharmaceutical Association in convention assembled unanimously elected him to honorary membership in recognition of his many contributions to the profession.

He was a member of the council of Bethlehem Lutheran Church for twenty years. He was a member of Robert Burns Lodge of Masons and other Masonic bodies.

Mr. Kramer is survived by his widow; a son, Charles, of the University of Maryland, College Park, Md.; a daughter, Mildred H. Kramer; a sister, Annie, and a brother, Adam, of Los Angeles.

Funeral Services were held at his home Monday afternoon, February 22nd; Rev. E. Martin Grove, Pastor of Bethlehem Lutheran Church officiated. Burial was made in Paxtang Cemetery.—J. B. P.

GUSTAVUS ELIOT.

Dr. Gustavus Eliot, one of the founders of the Connecticut College of Pharmacy, in 1925, died March first, following an attack of acute *angina pectoris*, aged 75 years. He had practiced medicine in New Haven for more than fifty years and was a former president of New Haven Medical Association.

Dr. Eliot was an alumnus of Yale of the class of 1877 and the College of Physicians and Surgeons of Columbia University, 1880. He is survived by his widow and three daughters.

HENRY B. SMITH.

Henry B. Smith, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, and former president of the New York Pharmaceutical Association, and the Brooklyn College of Pharmacy and one of the leading figures in New York pharmaceutical circles, died on February 2nd at his country home near Deposit, New York. He had been ailing for some time.

Impressive funeral ceremonies were held at the Brooklyn College of Pharmacy, on February 6th, Dr. S. Parkes Cadman, Pastor of the Central Congregational Church, officiated.

Dr. Smith was a trustee of the Brooklyn College of Pharmacy for thirty-one years and was largely responsible for the efforts which resulted in the new college building and was president of the College from 1913 to 1918. He had served as president of the New York State Pharmaceutical Association; the Drug and Chemical Square Club and the New York Veteran Druggists Association. He also was active in the AMERICAN PHARMACEUTICAL ASSOCIATION, the Kings County Pharmaceutical Association and held membership in the Society of Old Brooklynites.

He was a native of Brooklyn, where he was born sixty-five years ago, and here he conducted a retail pharmacy for more than thirty years, retiring several years ago and since devoting his time to raising the standards of pharmacy. He came from a line of pharmacists, his grandfather and uncle having been prominent in pharmacy; he was unmarried. An aunt survives him.

Besides the services held at the Brooklyn College of Pharmacy in which participated members of the board of trustees, faculty and student body, memorial services were also conducted by the various organizations of which the deceased was a member.

WILLIAM W. HAIRE.

William W. Haire, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, well and favorably known Fort Dodge pharmacist, died February 7th, at his home, after a week's illness with pneumonia, aged 62 years.

"Few people in Fort Dodge had a wider acquaintance and more friends than the deceased. A lifelong resident, and in business here for over forty years, he had a genial, kindly nature that won people to him."

Prominent throughout the state for his activities in pharmaceutical circles, he had served as *president* of the Iowa Pharmaceutical Association, *vice-president* of the N. A. R. D., member of the state board of pharmacy.

"Mr. Haire was born in Fort Dodge, October 27, 1869. His parents, Mr. and Mrs. John Haire, were of the pioneer settlers coming here in 1866. His father was one of the early merchants in Fort Dodge. After attending the Corpus Christi parochial and public schools, Mr. Haire went to Iowa City in 1888 and enrolled in the school of pharmacy, from which he was graduated in 1891. He first was associated with the Oleson drug store, Fort Dodge, later managed a drug store for H. M. Griffin, was then with the firm of Howey and Sackett. In 1895 he bought into the firm, which was henceforth known as it is today as Sackett and Haire.

"He is survived by his widow, a son and daughter."

GEORGE E. SHERMAN.

George E. Sherman, prominent Huron, South Dakota pharmacist and former president, both of the State Pharmaceutical Association and of the State Board of Pharmacy, died February 5th.

Mr. Sherman was taken ill a few days before his demise, which followed an attack of influenza with complications. He is survived by his wife and son, Lloyd, a student at the University of Minnesota.

"Mr. Sherman's early life was spent at Howard. He received his pharmaceutical training at the Highland Park College of Pharmacy, Des Moines, and entered in business at Canton in 1908. He also owned a store in Sioux Falls, and after eleven years in the southern part of the state, came to Huron, opening the drug store in partnership with Carl Moe. Two years ago, with Paul Ellis, the firm purchased the Corner Drug Store in Huron.

"Active in local civic and fraternal circles, Mr. Sherman was also well known in the professional circles, having held offices in the AMERICAN PHARMACEUTICAL ASSOCIATION and National Association of Boards of Pharmacy. He had recently been appointed for another term on the State board of pharmacy."

SOCIETIES AND COLLEGES.

SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Section Officers solicit coöperation in the preparation of the program for the Toronto meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. The names of the officers of the Sections are given below and members are requested to write as early as possible, giving the titles of the papers; the papers can be sent in later and should be accompanied by brief abstracts of them.

Scientific Section.—*Chairman*, L. E. Warren, Bureau of Chemistry, Washington, D. C.; *First Vice-Chairman*, W. J. Husa, U. of Fla., Gainesville, Fla.; *Second Vice-Chairman*, A. R. Bliss, Jr., Room 211P, 874 Union Ave., Memphis, Tenn.; *Secretary*, L. W. Rowe, % Parke, Davis & Co., Detroit, Mich.; *Delegate to the House of Delegates*, E. E. Swanson, % Eli Lilly & Co, Indianapolis, Ind.

Section on Education and Legislation.—*Chairman*, Rudolph H. Raabe, Ada, Ohio; *Vice-Chairman*, Charles W. Ballard, Mount Vernon, N. Y.; *Secretary*, Charles J. Clayton, Denver, Colo.; *Delegate to House of Delegates*, B. V. Christensen, Gainesville, Fla.

Section on Practical Pharmacy and Dispensing.—*Chairman*, W. G. Crockett, Medical College of Virginia, Richmond, Va.; *Vice-Chairman*, W. Paul Briggs, Washington, D. C.; *Secretary*, R. E. Terry, School of Pharmacy, University of Illinois, 701 S. Wood St., Chicago, Ill.; *Delegate to the House of Delegates*, I. A. Becker, Chicago, Ill.

Section on Commercial Interests.—*Chairman*, Rowland Jones, Gettysburg, S. Dak.; *Vice-Chairman*, Leon Monell, Buffalo, N. Y.; *Secretary*, John A. J. Funk, Galveston, Ind.; *Delegate to the House of Delegates*, J. G. Noh, Wichita, Kans.

Section on Historical Pharmacy.—*Chairman*, J. T. Lloyd, 300 Court St., Cincinnati, Ohio; *Secretary*, Louis Gershenfeld, Philadelphia, Pa.; *Delegate to the House of Delegates*, L. E. Warren, Bureau of Chemistry, Washington, D. C., *Historian*, E. G. Eberle, 10 W. Chase St., Baltimore, Md.

AMERICAN CONFERENCE ON HOSPITAL SERVICE.

Delegates William Gray and I. A. Becker of the AMERICAN PHARMACEUTICAL ASSOCIATION to the American Conference on Hospital Service made reports to President Walter D. Adams of the annual meeting held in Chicago, February 16th. Further reports will be made. Most of the papers read dealt with various phases of therapy. Considerable attention was also given to "Care of World War Veterans," "Hospital, Library and Service Bureau."

A resolution was passed requesting the constituent organizations to delegate officials to the annual meetings. The election resulted in the reëlection of President Dr. H. Mock and Secretary Evelyn Wood.

THE A. PH. A. EDUCATIONAL EXHIBIT AT THE IOWA MEETING.

The educational exhibit of the AMERICAN PHARMACEUTICAL ASSOCIATION and of the N. A. R. D., under the direction of Chairman Lee S. Coy, was eminently successful. The former exhibit had as the purpose the acquainting of pharmacists of Iowa with the ASSOCIATION and its promotions and also the education of the people relative to the profession of pharmacy. The booths were given free to the associations and the active interest of these co-workers is greatly appreciated. It will, no doubt, promote a better understanding of the work the national associations are doing and encourage other associations to follow the lead of the Iowa Association. A similar offer has been made by the Texas Association at its drug exhibit during the annual meeting in Austin.

Booth A3 was prepared for an educational exhibit by the AMERICAN PHARMACEUTICAL ASSOCIATION. President Walter D. Adams, Secretary H. C. Christensen, Vice-President Rowland Jones, Jr., and Chairman Lee S. Coy gave interesting talks on "The Regulation and Use of Drugs," during the days of the exhibit.

In Booth A7 there was a display of U. S. P. and N. F. preparations made by the students of the College of Pharmacy of the State University of Iowa. Dean W. J. Teeters, Prof. Zada M. Cooper, J. W. Jones, and H. A. Peterson were the lecturers at this booth.

At Booth A16 the N. A. R. D. distributed literature outlining the work of this organization in coöperation with U. S. P. and N. F. activities and, also, the results were shown of the Druggists Research Bureau. There were in attendance at this booth President John W. Dargavel, Paul C. Olsen and Merwin E. MacDonald. The address of Prof. Paul C.

Olsen of the Druggists Research Bureau was an interesting exposition of this work. The subject of the discussion was on "How to Obtain Net Profits." He explained that the Druggists Research Bureau was always ready to make analyses of stores and Professor Olsen invited those who heard him to make such requests by addressing him at 51 Maiden Lane, New York City. The service is free.

AUXILIARY COMMITTEE ON TRANSPORTATION, 1931–1932.

AMERICAN PHARMACEUTICAL ASSOCIATION.

T. J. Bradley, *Chairman*, 179 Longwood Ave., Boston, Mass.
A. R. Bliss, 874 Union Ave., Memphis, Tenn.
C. J. Clayton, 1042 E. Colfax Ave., Denver, Colo.
W. H. Cousins, Box 1736, Dallas, Texas.
E. N. Gathercoal, 701 South Wood St., Chicago, Ill.
C. C. Glover, 925 Sylvan Ave., Ann Arbor, Mich.
J. J. Grasser, 1234 St. Andrew St., New Orleans, La.
W. J. Husa, University of Florida, Gainesville, Fla.
D. B. R. Johnson, 1006 Classen Blvd., Norman, Okla.
C. E. F. Mollett, 436 Keith Ave., Missoula, Mont.
H. C. Newton, Creighton University, Omaha, Neb.
A. W. Pauley, 3130 North Grand Ave., St. Louis, Mo.
J. C. Peacock, 6733 Emlen St., Mt. Airy, Philadelphia, Pa.
John Culley, 503 Sheldon Bldg., San Francisco, Calif.
H. H. Schaefer, 115 W. 68th St., New York, N. Y.
E. R. Serles, University of South Dakota, Brookings, S. D.
Edward Spease, 4051 Scarborough Rd., Cleveland, Ohio.
L. J. Stabler, 1122 West 30th St., Los Angeles, Calif
L. E. Warren, Bureau of Chemistry, Washington, D. C.
W. H. Zeigler, 188 Tradd St., Charleston, S. C.
Adolf Ziefle, Oregon Agricultural College, Corvallis, Ore.

The members of the above-named committee will be pleased to give information relating to the Toronto meeting, in so far as this is now available.

FIRST CALL OF THE SECTION ON PRACTICAL PHARMACY AND DISPENSING A. PH. A.

To the Members of the Association and Their Friends:

The coming meeting of the ASSOCIATION to be held in Toronto, Canada, August 22 to 27, 1932 will afford a very interesting series of sessions. It is the desire of the officers of this Section to make their share of the program a very complete and worthwhile one, and to this end they invite all members interested in the work of the Section to participate.

Titles of papers, demonstrations or addresses should be transmitted to the Secretary as soon as possible, so that the program can be made up as soon as possible.

The officers are very desirous of reaching all those interested in this work, and if any member knows of a worker in this field, the Secretary would appreciate greatly if notified, so that a letter of invitation may be sent to these pharmacists.

Let us all help to make this meeting one that the Canadian pharmacists will remember for its completeness and interest.

R. E. TERRY, *Secretary*,
715 S. Wood St., Chicago, Ill.

W. G. CROCKETT, *Chairman*,
Medical College of Virginia, Richmond, Va.

PERSONAL ITEMS

Reference was recently made to the visit of our fellow-member J. Cameron, who is also a member of the Pharmaceutical Society of Great Britain, of the German Pharmaceutical Society, of North China Pharmaceutical Society, and Pharmacist of Peiping Union Medical College, Peiping, China. Thanks to the generosity of the Rockefeller Foundation, he was permitted to spend some fourteen months travelling round the world visiting the leading medical and pharmaceutical institutions in Europe and America; he traveled over fifty thousand miles from Peiping to Peiping, going home *via* Manila, Singapore, Egypt, Italy and France, and returning *via* the United States, Canada, Honolulu and Japan.

Dr. C. Leonard O'Connell, associate dean of the University of Pittsburgh College of Pharmacy, received the degree of Master of

Pharmacy, *honoris causa*, during the Alumni Day ceremonies of Philadelphia College of Pharmacy and Science. As speaker of the occasion, he delivered a masterful and forceful address upon the standards of education in pharmacy, stressing the fact that the training received by students in the four-year courses in pharmacy not only qualifies them professionally but also contains most of the elements of a college education in the liberal arts.

The following expression was made of record at the recent meeting of the Faculty of New York College of Pharmacy: "It is with a sense of distinct personal loss, that we note the resignation of Dr. Rusby as Professor of Materia Medica." A beautiful and spontaneous tribute was paid him, when his resignation was read. The Chairman reluctantly put the motion, that Dr. Rusby's resignation be transmitted to the Board of Trustees and calles for the "ayes." There was one "aye;" that of Dr. Rusby; and no "nays;" so the motion was carried by the one vote cast. The other members of the Faculty could not bring themselves to voting out of active service the beloved leader and on the other hand would not be selfish enough to insist on his staying in the harness when he wished to be relieved. Certainly his forty-six years of devoted and distinguished service for the College entitle him to comfortable and honorable retirement.

The 11th anniversary of the founding of the Philadelphia College of Pharmacy and Science, February 23rd, was the occasion of the presentation to the College by **H. K. Mulford,** 1887, of the fifth in the series of murals depicting the progress of pharmacy which are hung in the foyer of the Philadelphia College. In a moving address at the dedication, Mr. Mulford made the presentation in memory of his two famed preceptors, Joseph P. Remington, 1866, long dean of the Philadelphia College and Lucius E. Sayre, also 1866, at one time a business partner with Joseph P. Remington, and later dean of the University of Kansas School of Pharmacy.

NORTHWEST PHARMACEUTICAL BUREAU.

The annual meeting of the Northwest Pharmaceutical Bureau was held in Cedar Rapids, February 17th; President Joseph R. Sutter presided. Reports of the secretary and treasurer were approved, after which the annual election of officers was held, resulting as follows: *President*, R. M. Gibson, Des Moines, Iowa; *Vice-Presidents*, Joseph Vadheim, Tyler, Minnesota; P. H. Costello, Cooperstown, North Dakota; Otto J. Tommeraason, Madison, South Dakota; *Secretary*, Rowland Jones, Gettysburg, South Dakota; *Advisory Secretary*, G. A. Bender, Minneapolis; *Treasurer*, Al Falkenhainer, Algona, Iowa; *Executive Committee*, Joseph R. Sutter, Burlington, Iowa; E. L. Beezley, Cedar Rapids, Iowa; L. F. Seiberlich, Saint Paul; and N. Vere Sanders, Albert Lea, Minnesota.

The secretary reviewed the Bureau's activities during the year and presented a portfolio of results obtained in the Pharmacy Week publicity campaign.

The Bureau reviewed invitations for the Great Northwest Drug Show and voted to hold the Show in Des Moines in 1933, and in Minneapolis in 1934, to be held in conjunction with the Golden Jubilee convention of the Minnesota State Pharmaceutical Association. The secretary was instructed to send telegrams to Senators and Representatives on the committee approving the Capper-Kelly Bill.

SEVENTH DISTRICT REPRESENTATIVES N. A. B. P. AND A. A. C. P. TO MEET IN NEW ORLEANS.

Chairman John K. Clemmer, of Miami, Florida, of the Seventy District, National Association of Boards of Pharmacy, has called a special meeting of members of the Board for the Seventh District, to be held at the New Monteleone Hotel, in New Orleans, on Monday and Tuesday, March 28th and 29th.

States in the Seventh District include Alabama, Florida, Georgia, Louisiana and Mississippi, and representatives from each of these states will attend the meeting. Chairman E. L. Hammond is calling the meeting for representatives from the colleges represented in this group.

An excellent program has been arranged for the meeting. Speakers will include President A. L. Winne, of the National Association of Boards of Pharmacy, Secretary H. C. Christensen, of the N. A. B. P. and Dr. Townes R. Leigh, of the University of Florida, president of the American Association of Colleges of Pharmacy.

Special rates on railroads have been secured for this meeting at one fare plus one dollar for the round trip.

NATIONAL PHARMACEUTICAL ASSOCIATION OF CUBA.

At the meeting of the Cuban Pharmaceutical Association held on January 28th, the following were elected officers of the Association:

President, Dr. Jose Agustin Simpson; *Vice-President*, Dr. Eduardo C. Bello: *Secretary*, Dr. Jose Capote Diaz; *Vice-Secretary*, Dr. Francisco Daniel y Moreno; *Treasurer*, Dr. Juan Eligio Puig; *Vice-Treasurer*, Dr. Jaime Marti Urquiza; *Comptroller*, Dr. Jose Murillo Mambru.

SEVENTH ANNUAL DRUG TRADE DINNER, NEW YORK.

About 800 attended the banquet on March 15th, at Hotel Commodore. R. D. Keim presided as toastmaster; he introduced Gilbert K. Hodges, president of the Advertising Federation of America and member of the executive board of the *New York Sun*, as the principal speaker of the evening. In addition to Mr. Hodges there were a number of other speakers; prominent among them Lowell Thomas, news commentator, famous for his radio broadcasts; representatives of leading drug and chemical associations attended the dinner and were seated at the speakers' table. Among these were Secretary E. F. Kelly, Secretary Samuel Henry, President Evans E. A. Stone, Executive Vice-President Carson P. Frailey, President Frank Blair and President Roblin H. Davis.

Others who had been invited to sit at the speakers' table were: Senator Royal S. Copeland, President John Searle, President Nichols H. Noyes, President H. H. Bertram, President Ira Vendewater, President Barstow Smull of the Chamber of Commerce, State of New York; W. J. L. Banham, president of the New York Board of Trade, and others.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

At the annual meeting of the American Assocation for the Advancement of Science at New Orleans, Dr. John J. Abel, professor of pharmacology at the Johns Hopkins University Medical School, was elected president of the Association for 1932. Dr. Abel is the first pharmacologist to hold this office and the third representative of the medical sciences in the last thirty years, the other two being Dr. William H. Welch and Dr. Simon Flexner.

Important among Dr. Abel's accomplishments has been the part he has played in the organization of societies and the founding of journals. The founding of the American Society of Biological Chemists and the American Society of Pharmacology and Experimental Therapeutics was to a very large extent due to his efforts. In 1905, conjointly with the late C. A. Herter, he started the *Journal of Biological Chemistry*, which now appears in four volumes a year. In 1909 he gave up the editing of this journal and founded the *Journal of Pharmacology and Experimental Therapeutics*. The high standards he has set as editor of these two journals have greatly influenced the quality of publication in these fields in the United States. In recognition of this and of his important research contributions, Volume 29 of the *Journal of Pharmacology and Experimental Therapeutics* was dedicated to him in 1926 by his friends and pupils.

ASSOCIATION MEETINGS.

The following associations will celebrate their Golden Anniversaries this year: Alabama, Louisiana, Maryland and Massachusetts.

The American Medical Association will hold its annual meeting in New Orleans, May 9th to 13th.

The American Chemical Society will convene in New Orleans March 28th.

The 9th International Congress of Pure and Applied Chemistry will be held from April 3rd to April 10th.

The New York Pharmaceutical Conference will hold its meeting about April 19th.

The American Manufacturers of Toilet Articles will convene April 26th.

The Glass Container Association holds its sessions May 12th and 13th.

OFFICERS OF IOWA ASSOCIATION.

The annual election of Iowa Pharmaceutical Association was announced at the annual banquet. The following officers were elected:

President Emeritus, Emil L. Boerner, Iowa City.

Honorary President, George Judisch, Ames.

President, E. L. Beezley, Cedar Rapids.

Vice-Presidents, Olin E. Hill, Clinton; Otto Bjornstad, Spencer; L. R. Henderson, Muscatine.

Treasurer, J. M. Lindley, Winfield.

Members of Legislative Committee: George Judisch, *Chairman;* J. H. Weber, H. E. Eaton and W. F. Meads.

At the annual session of the Northwest Pharmaceutical Bureau, R. M. Gibson was elected as president.

KANSAS PHARMACEUTICAL ASSOCIATION.

The 53rd annual convention of Kansas Pharmaceutical Association will be held in Wichita. Among the national visitors will be President Walter D. Adams of the AMERICAN PHARMACEUTICAL ASSOCIATION; President Dargavel of the N. A. R. D.; Secretary Samuel C. Henry, W. Bruce Philip and others.

RHODE ISLAND ASSOCIATION.

Dean W. Henry Rivard of the Rhode Island College of Pharmacy and Allied Sciences was elected president of the Rhode Island Pharmaceutical Association at the 58th annual meeting on January 13th, at the College of Pharmacy. Dean Rivard succeeds Frank J. Duffy as head of the society.

Other officers elected were *Vice-President* Clarence Vars, of Westerly; *Secretary Treasurer*, James J. Gill, of Providence, and members of the Executive Committee, Henry J. McLaughlin, *Chairman;* Louis Guny and James F. O'Connor.

Plans were made for a 2-day convention at Narragansett Pier in July. A vote of thanks was given the retiring president and to the retiring secretary-treasurer, Vincent J. Fitz-Simon.

The Rhode Island Pharmaceutical Association is the second oldest organization of its kind in the United States.

NEW YORK STATE PHARMACEUTICAL ASSOCIATION.

A meeting of the officers and chairmen of the standing and special committees of New York State Pharmaceutical Association was held on February 8th at which time the various committee chairmen presented reports of the activities of the respective committees represented by them. A report was made relative to the state meeting to be held at Saratoga Springs, June 20th–24th.

PORTLAND RETAIL DRUGGISTS' ASSOCIATION.

The annual banquet and business meeting of the Portland Retail Druggists' Association was held March 4th. The remainder of the evening was devoted entirely to a discussion of matters affecting the drug industry.

IOWA PHARMACEUTICAL ASSOCIATION.

The annual convention of the Iowa Pharmaceutical Association was held at Cedar Rapids, February 16th–19th.

The attendance went far beyond our expectations as eight hundred were registered and four hundred thirty-nine were served at the Annual Banquet. Many who attended were good enough to say it was one of the best conventions of recent years.

The program was excellent and gave splendid satisfaction. The principal speakers were Wm. B. Burruss of New York; Dr. Paul C. Olsen also of New York; F. F. Flynn of St. Paul; Gov. Dan W. Turner of Des Moines; President Walter D. Adams of Forney, Texas; President John W. Dargavel of Minneapolis; H. F. Craney of Chicago; J. W. Luther of Chicago; and Dr. A. W. Erskine of Cedar Rapids.

The Northwestern Drug Exposition was a very beautiful exhibit and was well managed and well attended.

More than sixty booths were sold and the Drug Show was a pronounced success. Next year the Convention and Drug Show will be held in Des Moines and in 1934 the Drug Show will go to Minneapolis.

E. L. Beezley of Cedar Rapids was elected President of the Iowa Association for the ensuing year.

J. W. SLOCUM, *Secretary.*

MINNESOTA STATE PHARMACEUTICAL ASSOCIATION.

BY GUSTAV BACHMAN, SECRETARY.

The 48th Annual Convention of the Minnesota State Pharmaceutical Association was held at the Nicollet Hotel, Minneapolis, on February 10–12, 1932. More than 800 members and visitors from neighboring states registered at the Registration Desk. In all there were six sessions, five of which were business meetings and one a scientific and practical session.

The outstanding speakers for the general business sessions and their subjects were as follows:

Dean F. J. Pyle, of Marquette University, Milwaukee, Wis., who spoke on "Trends in Modern Merchandising."

The subject of George C. Frolich was "Pharmaceutical Business and the 1931 Depression."

R. E. Lee Williamson, Secretary of the Federal Wholesale Druggists' Association of Baltimore, Maryland, spoke on "Does the Drugstore Need Help?"

Prof. Ernest F. Witte of Ohio Wesleyan University spoke on "Problems of the Independent Druggist."

F. J. Nichols, of the National Cash Register Company, gave an address on "The Law of Compensation."

I. H. Bander of New York spoke on "One Ounce of Effort Behind How to Do It."

The Scientific and Practical Session was in charge of Dean F. J. Wulling, of the College of Pharmacy, University of Minnesota, who had on the program many scientific papers written by the faculty members of the University of Minnesota and also two guest speakers: Dr. E. A. Meyerding, secretary of the Minnesota State Medical Association, and Secretary H. C. Christensen, of the National Association of Boards of Pharmacy.

The entertainment program was in charge of W. B. Fields and both the ladies and men were liberally provided with high class entertainments.

The pharmacy fraternities and sororities gave luncheons and dinners, to which the alumni and guests from other colleges were invited.

The resolution recommending that the Association renew the affiliation with the N. A. R. D. and commending the splendid work done on the Capper-Kelly Bill was unanimously approved.

The officers elected are as follows:

President, Harry Iverson, St. Paul.

Vice-President, George H. Countryman, Fergus Falls.

Secretary, Gustav Bachman, Minneapolis.

Treasurer, H. Martin Johnson, St. Paul.

The Legislative Committee was instructed to draw a bill for the repeal of the 2-mile clause; also a bill creating a Drug Store Ownership law similar to the one now in effect in New York and South Dakota.

Dr. E. L. Newcomb was elected to honorary membership in the Association.

The 1933 Convention will be held in St. Paul during the month of February.

AMERICAN DRUG MANUFACTURERS' ASSOCIATION.

Coöperation of manufacturers and distributors will be the major topic at the session of the committee on sales and advertising problems of the American Drug Manufacturers' Association. This session will be held April 21st, S. DeWitt Clough, chairman of the committee will preside. Among the subjects for discussion are:

"How Manufacturers Can Coöperate with the Wholesale Drug Trade," by E. L. Newcomb, National Wholesale Druggists' Association.

"How Manufacturers Can Coöperate with the Retail Drug Trade," by Samuel C. Henry, National Association Retail Druggists.

"How Manufacturers Can Coöperate with the Council on Pharmacy and Chemistry of the American Medical Association," by Dr. Paul N. Leech, American Medical Association Laboratories.

"Incentive Compensation of Sales Organizations," by Carle M. Bigelow.

The meeting of the Association will be held April 18th to 21st, in the Greenbrier Hotel, White Sulphur Springs, W. Va.

LEGAL AND LEGISLATIVE.

THE PHILIP SURVEY.

At the Hotel Pennsylvania, New York City, representative manufacturers, on February 8th, met with W. Bruce Philip to discuss ten merchandising methods which he believes tend to make it almost impossible for the independent retailer to meet the competition of the predatory price-cutter. The majority of 7000 retail druggists who replied to a questionnaire which Mr. Philip sent to them asking that they make plain their attitude toward eleven nationally advertised products sold at deeply cut prices throughout the country, agree with Mr. Philip that the practices he named are inimical to the independent retailers.

Mr. Philip left the meeting with a message for retail druggists that, only in fair trade legislation, perhaps in several measures of this type, could they expect relief from the conditions of which they complain. The manufacturers present told him that they were helpless under existing conditions and laws to maintain prices. Mr. Philip, however,

is studying plans, based on the questionnaire and the discussion which will, it is hoped, lead to improved conditions. Only through discussions and willingness to coöperate can progress be made.

CONNECTICUT CENSUS REPORT.

The Census Report for Connecticut reveals that one-sixth of the total retail drug store sales of Connecticut is in the small towns having a population of less than 10,000. The figures are revealed in the final form of the 1930 census of the distribution for Connecticut—the first state on which figures have been issued.

Connecticut towns of less than 10,000 are accredited with a volume of retail drug store sales totaling $5,850,041; this is 15.6 per cent of the state's total sales. Chain drug stores total 18.43 per cent—this agrees quite closely with the chain drug store sales of the country.

Drug stores of the state with fountains do a business of nearly 80% of the total; the stores without fountains have a volume in prescriptions, drugs, patent medicines, sick room supplies, etc., running, probably, over 55% more than the drug stores with fountains. While prescriptions are considerably lower in the stores without fountains, what may be termed drugs, sick room supplies, patent medicines (including prescriptions) run to about 52% of the total sales, all of which is indicative of the larger percentage volume of medicines dispensed than accredited at some sources of information.

NARCOTIC TREATY PROVIDES CONTROL OF WORLD TRAFFIC.

The limitation of world manufacture of narcotics and the control of drug distribution is undertaken by an international convention signed by the United States at the Geneva Conference on the Limitation of the Manufacture of Narcotic Drugs.

A copy of the report of the American delegation to this conference was made public by the Department of State, March 7th, in which the delegation urged ratification of the convention by the Senate.

The convention puts into effect many of the restrictions already placed upon narcotic traffic in the United States, the report states. It provides a system whereby each country submits an advance estimate of its narcotic needs to a supervisory body. Manufacture thereafter must not exceed the total quantity shown by the estimates.

THE CAPPER-KELLY BILL REPORTED OUT BY SENATE COMMITTEE, WITHOUT RECOMMENDATION.

The Senate Committee has reported out the Capper-Kelly Bill, without recommendation. This action brings action on the Bill up to Congress and creates the opportunity for all in favor of the measure to educate Congressmen and Senators on the importance of it. It means, also, that the opportunity presented requires coöperative effort, if success is to be achieved. Let everyone do a part, and everyone can—there should be unanimity in action as well as individual action—let Congress know your views.

STATE LEGISLATION.

W. Bruce Philip, N. A. R. D. Counsel, in commenting on some of the state bills as follows: "Before the New York legislature are two bills—N. Y. Senate 152 and its duplicate Assembly bill 207, and Senate 721 and its duplicate 885. These bills demand the registration and licensing of insecticides or agricultural poisons. There is a fee of $10.00 a year for drug stores if insecticides are put up in original packages in the store, which means, Mr. New York Druggist, that there will be a $65,030.00 tax on the druggists of New York state if each store is licensed.

"Besides the tax there will be never-ending rules, regulations and inspections.

"Bills of this kind create salaried positions for some one. One good way to fight this type of legislation is to amend the bill so that a reasonable standard of the quantity of poison or active constituent shall be imprinted on the package. Further, amend the bill so as to eliminate the need for registration and the license fee. State officials are interested in bills which create new fees or positions, but they lose much of their interest if such fees are cut out of this type of legislation.

"New York druggists are also confronted with Senate Bill 624, which prohibits the sale of food in drug stores and pharmacies. In this bill it is mandatory that the license of the druggist or pharmacist be revoked if he violates the law. A bill like this is vicious and complicated. Suppose a package of baby food was sold in a drug store—the druggist would risk having his license revoked.

"Kentucky has a House Bill, No. 236, which makes it unlawful to expose for sale or have any article of food or drug without having printed on the bottle, can or package the

day and date such was packed, canned or bottled. In ninety per cent of the drug stores a large amount of the stock would become unsalable because customers would demand a recent date on all merchandise bought. If a bill like this has a chance of passing it might be amended to one requiring that only the year the article was put up be on the package.

"Massachusetts has several objectionable bills before the present legislature.

"House Bill 264 creates a department of public medicine and health. The doctors and dentists are well taken care of but not the pharmacists. Section 12 of this act provides for a department of pharmacists and chemists having an assistant medical administrator as chief.

"The medical administrator is directed to organize the pharmacists according to the plan offered for nurses. The assistant medical administrator in charge of the pharmacists is to receive, it appears from the bill $8000 a year plus possible allowances of $1700, making a total salary of $9700. The pay of the pharmacists is not mentioned, but as they are to be organized like the nurses the pay would probably be similar. The nurses' wages range from $1300 to $3200 (allowances included)."

MASSACHUSETTS AND KENTUCKY INTRODUCE "CAPPER-KELLY" BILLS.

Legislation legalizing contractual agreements controlling resale prices has been introduced in Massachusetts and Kentucky. Both measures are patterned closely after the "Junior Capper-Kelly" bill which was passed in California last year.

In other states, movements are under way to introduce similar measures. For the most part, the pharmaceutical associations of these states are leading the agitation on behalf of fair price legislation and it was from this source that the Kentucky and Massachusetts measures received their impetus.

VIRGINIA ASSOCIATION.

There is a bill before Virginia General Assembly imposing a tax of $50.00 a year on all units after the first one in a chain of stores.

Another bill restricts the sale of hypnotic drugs to pharmacists, but is not reconstructive to prescriptions.

Another bill restricts to a certain extent the activities of house to house canvassers.

ALEXANDRIA SENNA PODS.

The popularity of Senna Pods has been steadily growing in recent years, and a few particulars concerning the source of supply, the method of collection, and the grading system may be of interest. As readers are aware, there are two varieties of senna pods, both grown within the British Empire, namely: Alexandrian Senna Pods and Tinnevelly Senna Pods. The Alexandrian variety is generally preferred, being considered a milder laxative, and yet equally effective as the East Indian variety. The source of Alexandrian Senna Pods is the British Sudan; there are two grades, cultivated and wild. The former is cultivated on irrigated land around Omdurman and Khartoum. The wild senna is collected by natives, principally from the Dongola district, some ten days' camel journey from Omdurman. The cultivated senna plant produces mainly pods, whereas only a very small percentage of pods are procurable from the wild senna plant. Wild senna therefore grows to a height of approximately 3 ft. and is collected by natives who cut the entire plant at the root, in which form it is sold direct to the cleaners for grading.

The method of grading is as follows: 1. The stalks are separated and destroyed. 2. The leaves are then separated from the pods by means of sieves. 3. The leaves are then graded into three qualities: (*a*) Whole leaves (used for packing in cartons); (*b*) whole leaves and half leaves mixed; and (*c*) siftings. The two latter grades are used for manufacturing purposes, principally for liquid extracts. 4. The pods remaining are graded into four qualities: (*a*) Extra hand picked; (*b*) good hand picked; (*c*) ordinary hand picked; and (*d*) manufacturing.

Grades (*a*), (*b*) and (*c*) are used in this country for packing into cartons, in which form they are sold direct to the public. The manufacturing grade is used for the manufacture of liquid extracts, and according to the recent findings of the Sub-Committee of the British Pharmacopœia, it is now accepted that pods produce a better extract than leaves and siftings.—*Pharm. Jour. and Pharmacist.*

"The books which help you most are those which make you think most. The hardest way of learning is by easy reading; but a great book that comes from a great thinker—it is a ship of thought deep freighted with truth and beauty."